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Original Research Article

The effects of cognitive functional therapy in chronic pain management: A systematic review

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Cognitive Functional Therapy (CFT) is a multi-disciplinary approach that combines cognitive and behavioral techniques with physical rehabilitation and activity modification to help individuals manage chronic pain (CP) and improve their function. This systematic review aimed to evaluate the effectiveness of CFT for treating CP. The systematic review has been registered in the PROSPERO CRD42022335858, and the results will be reported according to the PRISMA guidelines. A comprehensive search was conducted in multiple electronic databases: Google Scholar, PubMed, PEDro, SpringerLink and Cochrane Library. A total of 1816376 studies were initially identified. After screening titles and abstracts, 73 studies met the inclusion criteria and were reviewed in full. 11 studies conducted by various authors, published in different journals between 2018 and 2022, were included, (n=10) concerning CLBP and (n=1) chronic neck pain. Most studies (n=3) compared the results with usual care, (n=2) the MT combined with exercises, (n=2) core exercises and education, one (n=1) the LST and (n=2) had no comparison group. The results of the studies are generally consistent, with most trials reporting significant improvements in disability, self-efficacy, fear of movement and quality of life after treatment. These promising results are due to changes in the beliefs and attending of independence of patients with CP. Only the pain intensity showed mixed results after the treatment. Further studies with larger sample sizes, longer follow-up periods, and rigorous control groups would help to strengthen the evidence for the effectiveness of CFT.

Keywords: Chronic pain, cognitive functional therapy, pain, function.

INTRODUCTION

Chronic pain states are characterized by a hyper sensitization of nociceptive neurons Gold and Gebhart (2010), a reduced endogenous inhibition of the nociceptive system (Edwards, 2005; Henderson et al., 2013; Staud, 2012), and maladaptive cortical processes (Phillips, 2009; Price, 2000). Strong solid evidence shows that it is associated with a complex interaction of biopsychosocial factors Belache et al. (2018). Musculoskeletal pain has been suggested to be often influenced by lifestyle and work activity, as some risk factors predispose to pain either because of the direct impact they have on the musculoskeletal system or because they affect lifestyle by promoting the onset of pain (Reis et al., 2019; Øiestad et al., 2020).

Chronic low back pain (CLBP) is a significant public health problem that affects a large proportion of the global population with immense social and economic impact across the lifespan (Hoy et al., 2014; Jakobsson, 2010; Roth-

Isigkeit et al., 2005; Khodadad et al., 2020). Despite the availability of various treatments, CLBP remains a significant cause of pain and functional disability, and many individuals continue to experience persistent pain Øiestad et al. (2020). Fear-avoidance behavior, prior or coexisting psychological disorder (anxiety and depression), and seeking financial compensation along with a prior history of back pain, poor muscle fitness (reduced back muscle endurance), and manual work are risk factors for developing a chronic LBP disorder Reis et al. (2019). Prominent guidelines underscore the imperative utilization of a biopsychosocial framework in the therapeutic management of chronic low back pain (CLBP). (Khodadad et al., 2020; Sullivan et al., 2007; Koes et al., 2010). As a result, there is a pressing need for effective and innovative treatments focused on the biopsychosocial model recommended by guidelines (NICE, 2016; Lin, 2019; Michaleff et al., 2014; Qaseem et al., 2017; Stochkendahl et al., 2018).

Cognitive Functional Therapy (CFT) is a multi-disciplinary approach that combines cognitive and behavioral techniques with physical rehabilitation and activity modification to help individuals with chronic pain (CP) manage their pain and improve their function (Koes et al., 2010). CFT is based on the premise that pain is not simply a physical phenomenon but is also influenced by psychological, social, and cultural factors (Wall and Melzack, 2005). This approach represents a novel, patient-centred intervention which directly challenges pain-related behaviors in a cognitively integrated, functionally specific, and graduated manner (Turk and Gatchel, 2002). CFT was designed to help physiotherapists individualize the management of people with non-specific CLBP (O'Keeffe et al., 2015).

CFT has a strong cognitive focus with an emphasis on reframing the persons' understanding of their back pain in a person-centred manner, with an emphasis on changing maladaptive movement, cognitive behaviors and lifestyle contributing to their vicious cycle of pain (O'Sullivan et al., 2018). The aims of this approach are to reconceptualize pain from a biopsychosocial perspective while dispelling unhelpful beliefs, overcome barriers to functional participation linked to their personally relevant goals and adopt a healthy lifestyle (Fersum et al., 2013), as well as change their thoughts, behaviors, and physical activity patterns to reduce pain and improve function (O'Keeffe et al., 2019).

Chronic pain represents a highly prevalent medical condition with the potential to exert a profound influence on an individual's quality of life, resulting in significant disability and imposing substantial healthcare expenditures. Although there is a growing body of research on the use of CFT, the results of previous reviews have yielded inconclusive findings. Therefore, a comprehensive review of the available evidence is necessary to provide a clearer understanding of the effectiveness of CFT as a treatment option for CP. The findings of this review can guide healthcare professionals in the management of CP and inform future research on this topic. The objectives of the review are to: (a) synthesize the available evidence on the effectiveness of CFT for CP; (b) identify any subgroup effects; and (c) provide recommendations for future research.

METHODOLOGY

Protocol and registration

The protocol of this systematic review was developed and has been registered in the International Prospective Register of Systematic Reviews (PROSPERO CRD42022335858). The results of this systematic review will be reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009).

Eligibility criteria

The inclusion criteria were designed to select relevant and high-quality research. The criteria included the following: (a) Participants with chronic low back pain or postoperative back pain; (b) Participants from all kinds of care; (c) Participants - without any serious pathologies, including fractures, metastases, infections, rheumatoid arthritis, neoplasms, osteoporosis, and radiculopathies; (d) Participants without LBP following pregnancy; (e) Intervention - Studies examining the effects of CFT for CP; (f) Outcome measures - Studies that reported on pain and functional disability were eligible for inclusion; (g) Study design - randomized controlled trials (RCTs), controlled clinical trials (CCTs), and cohort studies were eligible for inclusion; and (h) Publication date - Only studies published up to 2022 were eligible for inclusion.

Data sources and search strategy

The following electronic databases were searched Google Scholar, PEDro, PubMed, and Cochrane Library. No limitation on the publication date was applied. The search was conducted using the following keywords: "cognitive functional therapy", "chronic low back pain", "chronic neck pain", "chronic pain". No language restrictions were applied.

Study selection

Eligibility screening of the studies was conducted in a blinded standardized way by two independent reviewers (Ev.T.) (Em.T.). As shown in Figure 1, titles and abstracts were screened using and duplicate articles were excluded. After screening titles and abstracts, full paper copies were retrieved. Full text screening was also performed blinded by the same reviewers. Disagreements between authors during any stage of the screening process were resolved by consulting a third reviewer (A.X.). The screening process

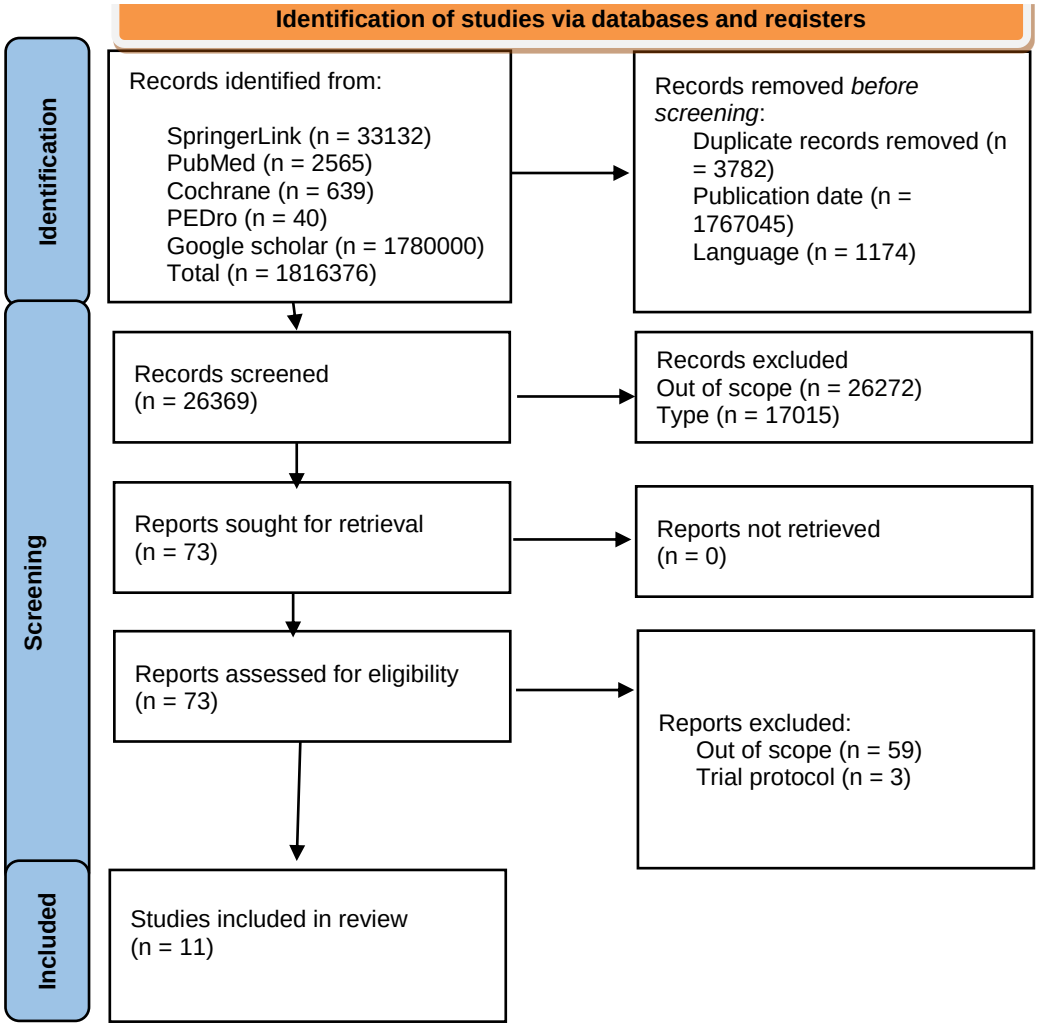

Figure 1: PRISMA- flow diagram of the study selection of the review

involved first analyzing the study title and abstract, followed by an assessment of the full text.

Rather than excluding smaller trials due to concerns about bias (Moher et al., 2009; Dechartres et al., 2013; Eccleston et al., 2015; Guyatt et al., 2011; Williams et al., 2020), this review presents a descriptive overview of eligible trials with less than 20 participants per arm at randomization. This approach enables the exploration of innovative or potentially effective methods of placebo control (Hohenschurz-Schmidt et al., 2023). All eligible studies were incorporated, given the limited existing literature on this approach.

Data extraction

Two reviewers independently screened the titles and abstracts of all studies identified in the initial search. Full-text articles of studies that met the inclusion criteria were reviewed, and relevant data were extracted. Data extracted included the participants, interventions, outcomes, study design, and results. All discrepancies were referred to and solved by a third independent reviewer.

RESULTS

A total of 1816376 studies were identified in the search for a systematic review of the effectiveness of CFT for CP. After the screening of titles and abstracts, 73 studies met the inclusion criteria and were reviewed in full. A total of 11 studies were eligible for inclusion in the final analysis.

Fersum et al. (2013) conducted an RCT to evaluate the effectiveness of CB-CFT compared to manual therapy and exercise in patients with nonspecific CLBP. The sample consisted of 121 participants who were assigned in the CB-CFT group (n=62), and the MT-EX group (n=59). The intervention group received 12 weeks of CB-CFT and involved a 12-week follow-up assessment of the effects of CB-CFT. The group that underwent classification-based CFT showed significantly better results than the manual therapy and exercise group, both statistically ($p < 0.001$) and clinically. The classification-based CFT group experienced a

13.7-point improvement in the Oswestry Disability Index, while the manual therapy and exercise group only showed a 5.5-point improvement. Additionally, the classification-based CFT group experienced a 3.2-point reduction in pain intensity, compared to the manual therapy and exercise group's 1.5-point reduction.

Fersum et al. (2019) After 6 years examined the long-term effects (over a three-year follow-up) of CFT in treating patients with non-specific CLBP. The study included 121 participants, with half of them receiving CFT and the other half receiving a manual therapy and exercise (MT-EX). Thirty participants (48.4%) in the CFT group and 33 participants (55.9%) in the MT-EX group had available data for the three-year follow-up. The assessment tools used in the study included the Oswestry Disability Index (ODI), Numeric Rating Scale (NRS), Fear Avoidance Belief Questionnaire FABQ), Hopkins Symptoms Checklist (HSC), and Pain Catastrophizing Scale (PCS). The CFT group showed significantly greater reductions in disability compared to the MT-EX group, as evidenced by the ODI scores at 3 years which were 6.6 points lower in the CFT group (95% CI: -10.1 to -3.1, p <.001, standardized effect size = 0.70). However, there was no significant difference in pain intensity between the two groups at 3 years (0.6 points, 95% CI: -1.4 to 0.3, p= .195). In addition, the CFT group also showed significantly greater reductions in HSC and FABQ-Work scores.

Ng et al. (2015) evaluate the effectiveness of CFT in managing LBP in male adolescent rowers. The randomized controlled trial included 36 adolescent male rowers, with 19 receiving CFT and 17 receiving usual care. The intervention lasted for 8 weeks, with follow-up assessments at 3 and 6 months. The results showed that CFT had a significant positive effect on pain (NPRS −2.4, p= 0.008), disability, and physical function (Patient Specific Functional Scale-PSFS (4.1, p= 0.01); Roland Morris Disability Questionnaire-RMDQ (−1.7, p= 0.003) compared to the control group at 6 months, with a between-group difference of 1.0 points on the NPRS, 4.0 points on the ODI, and 6.0 points on the PSFS, all favoring the CFT group (p <0.05).

O'Keeffe et al. (2020) examined the effects of this approach on patients with non-specific CLBP for patients awaiting an appointment with a specialist medical consultant. The study consisted of 26 participants and was conducted in three phases (A1-B-A2). During phase A1, pain and functional disability were measured at three different times over a three-month period. In phase B, participants underwent approximately eight CFT sessions over an average of 12 weeks. Phase A2 was a 12-month follow-up period with no treatment. The results showed statistically significant improvements in functional disability and pain immediately post-intervention, which were maintained over the 12-month follow-up period. These reductions were clinically significant for both functional disability and pain (p <0.001). The secondary psychosocial outcomes, including depression, anxiety, back beliefs, fear of physical activity, catastrophizing, and self-efficacy, were also significantly improved after the intervention. Overall, these findings suggest that CFT is an effective approach for managing non-specific CLBP in patients awaiting a specialist medical consultant appointment.

Bunzli et al. (2016) aimed to explore patient perspectives on participation in CFT for CLBP. The study included 14 participants who received CFT for 12 weeks. The qualitative analysis yielded three distinct groups: large improvers, small improvers, and unchanged. The study identified two key themes essential for achieving positive outcomes through CFT: (1) changing pain beliefs and (2) attaining independence. To adopt a more biopsychosocial perspective towards pain, patients needed a strong therapeutic alliance, heightened body awareness, and a sense of control over pain. Large improvers achieved independence by acquiring problem-solving skills, developing self-efficacy, reducing fear of pain, and improving stress-coping mechanisms. However, small improvers, who still harbored residual fear and lacked effective stress-coping strategies, remained easily distressed and unable to attain independence. Unchanged participants continued to view themselves through the lens of their pain and clung to a biomedical perspective.

Conway et al. (2019) evaluated the effectiveness of CFT-based rehabilitation in UK military personnel with persistent LBP. A total of 238 military personnel were included in the sample and randomly assigned to either the intervention or control group. The evaluation tools were multistage locomotion test (MSLT) and sit and reach test. Psychosocial outcomes include: Tampa Scale of Kinesiophobia (TSK), ODI, Brief Pain Inventory (BPI), General Anxiety Disorder-7 (GAD-7), and Patient Health Questionnaire-9 (PHQ-9). Significant improvements were observed in endurance (MSLT), range of motion, kinesiophobia, pain-related lifestyle interference (BPI-Lifestyle), anxiety, and depression (p ≤0.001). However, the study did not demonstrate any improvements in pain intensity (BPI-Intensity) (p >0.05). Following three weeks of CFT-based multidisciplinary rehabilitation, function and psychosocial health improved, with reduced pain symptoms during daily activities.

Khodadad et al. (2020) aimed to compare the effectiveness of CB-CFT to lumbar stabilization treatment (LST) in patients with CLBP. The sample consisted of 52 participants (mean age, 44.3 ± 2.46 years) who were randomly allocated to either the CB-CFT group (n = 17), LST (n = 17), or the control group (n=18). The intervention group received 12 sessions of CB-CFT over 10 weeks, while the control group received LST. The results showed that both the LST and CFT groups showed significant reductions in pain and Lumbar Movement Control (LMC) after 8 weeks, but there were no significant differences in the changes between the two groups. The percent change in pain from pretest to posttest was a decrease of 45% (P= 0.003) in the LST group and 40% (P= 0.003) in the CFT group. In terms of LMC, the LST group presented a decrease of 100% (P= 0.026) compared to a decrease of 200% (P= 0.018) in the CFT group. The contro l group did not show

Table 1. Studies included in the systematic review of CFT for CP.

Study	Sample Size	Participants	Intervention	Control Group	Assessment Tools	Results
V. Fersum 2013 [28]	121	Patients with nonspecific CLBP	CB-CFT	MT-EX	ODI, NRS, FABQ, HSC, PCS	The CFT group showed a 13.7 point improvement in the ODI and a 3.2 point reduction in pain intensity, while the MT-EX only showed a 5.5 and 1.5 point reduction.
V. Fersum 2019 [37]	63	Patients with nonspecific CLBP	CFT	MT-EX	ODI, NRS, FABQ, HSC, PCS	ODI scores at 3 years were 6.6 points lower in the CFT group (95% CI: -10.1 to -3.1, p < .001, standardized effect size = 0.70). No significant difference in pain intensity between the two groups at 3 years (0.6 points, 95% CI: -1.4 to 0.3, p = .195).
Ng 2015 [38]	36	Male adolescent rowers with LBP	CFA	Standard PT	NPRS, PSFS, RMDQ.	The CFA group had a significant positive effect (NPRS −2.4, p=0.008), (PSFS 4.1, p=0.01); RMDQ (−1.7, p=0.003) compared to the control group at 6 months, with a between-group difference of 1.0 points on the NPRS, 4.0 points on the ODI, and 6.0 points on the PSFS, all favoring the CFA group (p < 0.05).
K. O'Sullivan 2015 [39]	26 multipe case cohort study	Non-specific CLBP	CFT	None	NMQ, ODI, Pain severity, NRS, DASS21, FABQ, PCS, PSEQ, STarT Back screening tool	Stat. sign. Improvement in pain (p<0.001) and disability (p<0.001) post-intervention and over the 12-moth period. Depression, anxiety, back beliefs, fear of physical activity, catastrophising and self-efficacy was also sign. Improved (p<0.001).
Bunzli 2016 [40]	14	Patients with CLBP	CFT disability outcomes post intervention	CFT theoretical sampling	ODI, TSK	CFT provide main two keys: changing pain beliefs and attaining independence
Conway 2019 [41]	238	UK military personnel with persistent LBP	CFT	None	MSLT, sit and reach test, TSJ, ODI, BPI, GAD-7. PHQ-9	MSLT distance (Z=6.94, p<0.001) moderate effect (r=0.34). TSK scores between admission and discharge (Z=−6.07, p<0.001). At discharge, the prevalence of patients reporting ≥ moderate symptoms of anxiety and depression decreased from 33% to 26% and 43% to 29%, respectively.
Khodadad 2020 [42]	52	Patients with LBP	CFT	LST and control group	LMC test, VAS, ODI, BRFs	Percent change for pain between pretest and posttest values in the LST group was a decrease of 45% (P = 0.003), compared with a decrease of 40% (P = 0.003) in the CFT group. Change in LMC in the LST group was a decrease of 100% (P = 0.026), compared with a decrease of 200% (P = 0.018) in the CFT group. There was no change for both variables in the control group.
O' Neill 2020 [43]	206	Patients with CLBP	CFT	Exercise group	PSEQ, DASS, FABQ, CSQ, SHCI, ODI, NPRS	CFT caused a significant change in self-efficacy (5.82, 95% CI = 1.58, 10.05), and self-efficacy was associated with both disability (-0.41, 95% CI = -0.66, -0.16) and pain intensity (-0.07 (-0.13, -0.02). CFT did not improve the remaining six hypothesised mediators (stress, fear of physical activity, coping, depression, anxiety and sleep), and these mediators were not associated with either disability or pain.

any change in either variable.

O'Neill et al. (2020) aimed to examine the factors that mediate treatment effects in CFT for CLBP. The sample consisted of 206 participants who were randomly divided to the CFT group (n=106) and exercises group (n=100). This study employed causal mediation analysis to explore the potential psychological and lifestyle factors that mediate the effect of CFT on disability and the lack of effect

Table 1. Cont.

Javdaneh 2020 [44]	72	Patients with chronic neck pain	SE+CFT	SE and control group	VAS, TSK, SDRI	Stat. sign differences in pain intensity were found at SE+CFT group and the scapular exercise alone group at 6 weeks (effect size (95% CI) = -2.56 (-3.32 to -1.80); P = 0.019). Kinesiophobia, showed a significant between-group difference at 6 weeks (effect size (95% CI) = -2.20 (-2.92 to -1.49); P = 0.005), with the superiority of effect in SE+CFT. A significant between-group differences was observed in muscle activity. Significant between-group differences favoring experimental groups versus control.
K. Ussing 2020 [45]	224	Non-specific CLBP	CFT	Usual care	RMDQ, EuroQOL EQ-5D-5L, database SpineData	Stat. sign. difference in disability favored the CFT group (–20.7, 95% confidence interval [CI] ¼ –27.2 to –14.2, P < 0.001) and for LBP and leg pain, fear, anxiety, and catastrophizing. At 12-month follow-up, the difference in disability was smaller and no longer statistically significant (–8.1, 95% CI ¼ –17.4 to 1.2, P ¼ 0.086).
O' Keeffe 2020 [46]	206	Patients with CLBP	CFT	GEE	ODI, NPRS, SHCI	CFT group had a significantly greater improvement at 6 months (mean difference, 8.65; 95% CI 3.66 to 13.64; p=0.001), and at 12 months (mean difference, 7.02; 95% CI 2.24 to 11.80; p=0.004). compared with the GEE group

on pain in comparison to a group exercise and education intervention. The hypothesized mediators, including pain self-efficacy, stress, fear of physical activity, coping, depression, anxiety, and sleep, were measured at 6 months, while functional disability and pain intensity at 12 months served as outcomes. The results suggest that the primary benefit of CFT (compared to the group exercise and education intervention) on disability is through increased pain self-efficacy. However, the majority of the hypothesized mediators, such as stress, fear of physical activity, coping, depression, anxiety, and sleep, were not improved by CFT, and they were not associated with either disability or pain. It should be noted that this study has a significant proportion of missing data, and the findings can only be considered as hypothesis-generating.

The purpose of Javdaneh et al. (2020) study was to investigate the effectiveness of scapular exercises combined with CB-CFT in reducing chronic neck pain and kinesiophobia. The sample consisted of 72 participants (20–45 years old), who were randomly allocated to either the intervention group or the control group. The intervention group received scapular exercises combined with CB-CFT for 8 weeks, while the control group received scapular exercises alone. The results showed that the intervention group had significant improvements in pain intensity, kinesiophobia, and neck function compared to the control group. The study suggested that the combination of scapular exercises and CB-CFT may be an effective intervention for chronic neck pain.

Ussing et al. (2020) study aimed to investigate the impact of CFT on patients with non-specific CLBP compared to usual care. The study involved 39 patients who received CFT intervention and were matched with 185 control patients who received usual care. The primary outcome was the disability, and other factors such as LBP and leg pain, fear, anxiety, and catastrophizing were also measured. The results showed that at the six-month follow-up, patients who received CFT showed a significant and clinically relevant difference in disability compared to the control group. The difference in disability was smaller at the 12-month follow-up, and leg pain intensity and fear remained significantly better in the CFT group. Treatment satisfaction was also higher in the CFT group at both follow-up periods. These findings suggest that CFT is a beneficial treatment for NS-PLBP patients who do not respond to primary care interventions.

The multicenter randomized controlled trial by O'Sullivan et al. (2015) aimed to compare the effectiveness of CFT with a group-based exercise and education intervention (GEE) for CLBP. The trial included 206 participants, with 106 receiving CFT and 100 receiving GEE. The intervention had mean duration 5 treatments, with follow-up assessments at 6 and 12 months. The results showed that CFT had a significantly greater improvement in disability at 6 months (mean difference, 8.65; 95% CI 3.66 to 13.64; p= 0.001), and at 12 months (mean difference, 7.02; 95% CI 2.24 to 11.80; p= 0.004) compared with the GEE group. In pain there was no statistically significant difference between the two groups at 6 months (mean difference, 8.65; 95% CI 3.66 to 13.64; p= 0.001), and at 12 months

(mean difference, 7.02; 95% CI 2.24 to 11.80; p= 0.004). The authors concluded that CFT presented to be a more effective treatment option for disability, but not pain, for CLBP compared with GEE.

Table 1 summarizes the results of the studies included in the systematic review of CFT for CP. The results suggest that CFT may be effective in reducing pain and improving function in individuals with CLBP. However, the quality of the evidence is generally low, and further research is needed to provide stronger evidence of the effectiveness of CFT for CP.

DISCUSSION

There is a growing body of evidence suggesting that CFT may be an effective intervention for reducing pain and improving function in CP management. CFT has been recommended as an effective treatment in both single and group treatments in people with musculoskeletal pain Jensen et al. (1991) including non-specific LBP Lansinger et al. (2013). CFT has yielded a larger effect on disability than the effect observed in systematic reviews and clinical trials of pharmacological and non-pharmacological intervention for CLBP (O'Keeffe et al., 2015; Johnson and Smith 2019; Moseley et al., 2004; Van Tulder et al., 2002).

A systematic review and meta-analysis of 10 randomized controlled trials conducted in 2016 by Moher et al. (2009) found that CFT was more effective than usual care or other physical therapies for reducing pain and improving function in patients with CLBP. Another review published in 2017 (Dechartres et al., 2013) concluded that this approach is effective in reducing pain, disability, and fear-avoidance beliefs in patients with CLBP. A 2018 meta-analysis (Eccleston, et al., 2015) of 6 randomized controlled trials reported that CFT was more effective than other forms of exercise in pain and function in patients with CLBP. A 2020 meta-analysis (Guyatt et al., 2011) of 8 randomized controlled trials found that CFT was more effective than other physical therapies for improving pain, disability, and quality of life in patients with CLBP.

In total, there are 11 studies examining the efficacy of CFT conducted by various authors, published in different journals between 2018 and 2022. The trials included in this review all investigate the efficacy of CFT in the treatment of CLBP and one in chronic neck pain.

Several of these studies have found CFT to be a promising intervention for CLBP, with improved outcomes in pain, physical function, and quality of life. In more detail, all of the included studies showed statistically significant improvement in disability. Although disability and pain are related, the results in pain intensity were mixed. Most of the included trials presented significant changes in the pain intensity after the intervention (Fersum et al., 2013; Ng et al., 2015 ; O'Keeffe et al., 2020; Khodadad et al., 2020; O'Neill et al., 2020; Javdaneh et al., 2020) while some showed no statistical improvement (Fersum et al., 2019; Conway et al., 2019; O'Sullivan et al., 2015). This difference may be due to the time of the evaluation. The studies that presented no improvement in pain intensity conducted a 6-month, 12-month (Conway et al., 2019; O'Sullivan et al., 2015), and 3-year (Fersum et al., 2019) follow-up.

As far as the comparing treatments, most studies (n=3) used the usual care (Ng et al., 2015; Conway et al., 2019; Ussing et al., 2020), (n=2) MT combined with exercises (Fersum et al., 2013; Fersum et al., 2019), (n=2) exercises and education (Javdaneh et al., 2020; O'Sullivan et al., 2015), (n=1) the LST (Khodadad et al., 2020) and (n=2) no comparison group. Additionally, some studies investigated the effectiveness of CFT in different patient populations. The study by Ng et al. (2015) found that CFT was effective in managing LBP in male adolescent rowers. The study by Conway et al. Conway et al. (2019) examined the clinical outcomes in UK military personnel with persistent LBP. This approach presented significant improvements in those populations concerning disability, endurance, pain related lifestyle interference, anxiety, depression, pain and physical function.

In order to fully examine the effectiveness of CFT, some studies have investigated the mechanisms underlying its effects. The study by O'Neill et al. (2020) conducted a mediation analysis of a CFT clinical trial and found that changes in pain catastrophizing, kinesiophobia, and self-efficacy mediated the treatment effect. Furthermore, the study of Bunzli et al. (2016) examined patient perspectives on participation in CFT for CLBP and found that patients had positive experiences with the intervention, with improvements in pain, physical function, and quality of life.

Overall, these studies suggest that CFT is a promising intervention for CLBP and chronic neck pain.. The findings of this study align with previous research. While more research is needed to fully understand its mechanisms of action, these studies provide strong evidence for the effectiveness of CFT in improving patient outcomes.

Limitations

Despite the promising results of the studies reviewed, there are several limitations that need to be considered. Firstly, most of the studies are limited by their sample size, which may limit the generalizability of the findings. For instance, the study by Bunzil et al. (2016) had a small sample size of only 14 participants, which may affect the statistical power of the study. Secondly, most of the studies relied on self-reported outcomes, which may be subject to bias and inaccuracies. For example, the study by O'Sullivan et al. (2015) relied on self-reported measures of pain and disability, which may not necessarily reflect objective improvements in physical function. Additionally, the lack of blinding in some of the studies may have introduced bias, as participants may have been influenced by their expectations of the treatment. Moreover, some of the studies did not provide long-term follow-up data, which makes it difficult to assess the sustainability of the treatment effects. For example, while the study by Fersum et al. (2019) reported positive outcomes at 3-year follow-

up, it remains unclear whether these effects are sustained beyond this time frame. Finally, most of the studies were conducted in controlled clinical settings, which may limit the generalizability of the findings to real-world settings. Overall, while the studies provide promising evidence for the effectiveness of CFT, more research is needed to address these limitations and further investigate its long-term effectiveness in real-world settings.

Conclusion

The present review suggests that CFT is an effective intervention for CP management. The results of the studies are generally consistent, with most trials reporting significant improvements in disability, self-efficacy, fear of movement and quality of life after treatment. These promising results are due to change in the beliefs and attending of independence of patients with CP. Only the pain intensity showed mixed results after the treatment. Further studies with larger sample sizes, longer follow-up periods, and rigorous control groups would help to strengthen the evidence for the effectiveness of CFT for CP management.

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