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Protocols

A Cognitive Functional Therapy+ Pathway Versus an Interdisciplinary Pain Management Pathway for Patients With Severe Chronic Low Back Pain (CONFeTTI Trial): Protocol for a Pragmatic Randomized Controlled Trial

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Abstract

Objective. Chronic low back pain (cLBP) is the leading cause of disability. Interdisciplinary pain management is recommended for patients with severe/high-impact cLBP. Such programs are expensive, not easily accessible, and have limited effect; therefore, new cost-effective strategies are warranted. Cognitive functional therapy (CFT) has shown promising results but has not been compared with an interdisciplinary pain management approach. The primary aim of this randomized controlled trial is to investigate if a pathway starting with CFT including psychologist support (CFT+) with the option of additional usual care (if needed) is superior in improving disability and more cost-effective at 12 months compared with an interdisciplinary pain management pathway (usual care).

Methods. This pragmatic, 2-arm, parallel-group randomized controlled trial will randomly allocate patients (n = 176) aged 18 to 75 years referred to an interdisciplinary pain center due to severe cLBP to 1 of 2 groups (1:1 ratio). Participants randomized to CFT+ will participate in a 3-month functional rehabilitation pathway with the option of additional usual care (if needed), and participants randomized to the interdisciplinary pain management pathway will participate in an individualized program of longer duration designed to best suit the individual's situation, needs, and resources. The primary outcome is the proportion of participants with an 8-point improvement in the Oswestry Disability Index score at 12 months. Exploratory outcomes are change in Oswestry Disability Index scores over time and an economic analysis of quality-adjusted life years using the 3-level version of the EuroQol EQ-5D.

Impact. The study evaluates the cost-effectiveness of CFT+ with the option of additional usual care (if needed) for individuals with severe cLBP. Findings can potentially improve future care pathways and reduce cost for the health care system.

Keywords: Costs and Cost Analysis, Cognitive Functional Therapy, Health Care Costs, Interdisciplinary Pain Management, Low Back Pain

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Introduction

Chronic low back pain (cLBP) is one of the leading causes of disability around the world.[1,2] Because various biopsychosocial factors contribute to cLBP,[3] clinical guidelines recommend referral to interdisciplinary pain management programs in secondary or tertiary care settings for patients who do not benefit from primary care treatments.[4,5] However, systematic reviews have shown that such programs have limited effect,[6] are not easily accessible,[7] and are often expensive.[8] Therefore, more effective and less expensive strategies targeting the multidimensional nature of cLBP are needed.

Cognitive functional therapy (CFT),[9] which is a physical therapy–led treatment approach targeting important drivers of disability in the individual, has shown promising short- and long-term results in individuals with cLBP compared with education, exercise, and manual therapy.[10–13] However, these studies have methodological shortcomings, including high loss of follow-up, multiple primary outcomes, and lack of assessor blinding. We recently performed an observational pilot study of CFT in patients with cLBP referred to an interdisciplinary pain center with encouraging results. A substantial number of patients experienced reduced disability and with substantially fewer consultations compared with the usual interdisciplinary pain management approach,[14] warranting testing of the CFT intervention in a fully powered trial. In the pilot study, we noted that there were barriers to optimal treatment engagement for some patients[14] (eg, lack of motivation) and that several patients with high levels of psychological distress had limited benefits. Inclusion of early psychologist support to assist in promoting behavioral change and directly target deeper behavioral strategies could potentially improve patient adherence to the CFT intervention.[15]

The primary aim of this pragmatic randomized controlled trial (RCT) is to investigate if a physical therapy–led CFT pathway that includes psychologist support (CFT+) with the option of additional usual care (if needed) is superior to the currently recommended interdisciplinary pain management pathway (usual care) in reducing disability at 12 months in individuals with high-impact cLBP. In addition, an economic evaluation will investigate total health care costs of the 2 pathways at 12 months.

Methods

This study protocol describes the design of a parallel-group RCT (1:1 randomization ratio) conducted at the Pain Center, Odense University Hospital, Denmark (Figure). The study protocol conforms to the Standard Protocol Items: Recommendations for Interventional Trials, and The Consolidated Standards of Reporting Trials of Non-pharmacological Treatments will be used as a guideline for reporting this trial. The study was registered at ClinicalTrials.gov in August 2020 (NCT04399772); recruitment started in September 2020 and is expected to finish in December 2022.

Participants

Patients with cLBP referred for treatment at the Pain Center, which is an outpatient tertiary care clinic treating patients with high-impact chronic (>6 months) non-malignant pain. Patients have tried a number of treatments in primary and secondary care settings with an unsatisfactory clinical response. Before being referred to the Pain Center, it is required that patients are thoroughly examined by their general practitioner or in a specialist setting to exclude red flag disorders such as fracture, malignancy/cancer, cauda equina syndrome or progressive neurological disorder, inflammatory or infective diseases of the spine, and suspected radiculopathy.

Inclusion Criteria

- Adults aged 18 to 75 years
- Adequate Danish language skills
- cLBP (pain in the area between the 12th rib and buttock crease lasting more than 6 months)[16]
- Low back pain self-reported as significant contributor to daily disability (yes/no)
- Low back pain intensity >4 on 0 to 10 numerical rating scale
- Provide consent that data collected via questionnaires and registries can be used for research purposes

Exclusion Criteria

- Previously attended an interdisciplinary pain management program
- Wheelchair bound
- Suicidal ideation; evaluated using Patient Health Questionnaire-9 (item 9 has to be answered "never")
- Self-reported former/present addictive drug/alcohol behavior
- Self-reported current pregnancy

Recruitment Procedure

The study has ethics approval to withhold the true aim of the study for the participants. Thus, participants will not be aware that they are randomized to different pathways. After referral to the Pain Center but before the initial consultation, participants will be asked to complete an electronic questionnaire (PainData) sent as a personal letter and linked to the participants' official inbox (e-Boks, the official secure channel used to send official documents to Danish citizens). In this letter, participants will be informed that the Pain Center is conducting a randomized study investigating the effect of the order of the various treatment elements in the interdisciplinary pain management approach, but they are not made aware of the 2 different treatment pathways. Participant masking in this study is performed to ensure that included participants are as identical to those in the usual clinical setting as possible to provide better generalizability from the setting of the RCT to the settings where the results are likely to be applied. When eligible individuals consent to participate, they will be randomized to 1 of the 2 pathways. Advantages of this recruitment procedure with participant blinding include: (1) participants are already scheduled to receive the interdisciplinary pain management pathway of interest, which would be difficult to ensure if participants were recruited from alternative settings (eg, primary care settings); and (2) minimizing the recruitment of participants more positively biased towards the CFT+ pathway as participants were already scheduled to receive the interdisciplinary pain management approach. The ethical committee made the blinding of participants to the pathways conditional on the study allowing participants to receive usual care after 3 months CFT+, should that be clinically indicated

(see section CFT+ with the option of additional usual care, if needed).

Randomization

The randomization sequence will be computer generated in blocks of 2 and 4, prepared by an independent study coordinator with no other involvement in the trial. The randomization sequence will be distributed and stored in sealed opaque envelopes handled only by a secretary not involved in the 2 treatment pathways or statistical analyses.

Pathways

CFT+ With the Option of Additional Usual Care (If Needed)

Participants allocated to the CFT+ pathway will participate in a 3-month (maximum of 10 sessions) individualized intervention (Tab. 1). CFT+ (9,17) has 3 main components: (1) *making sense of pain* using the participant's own story and their experience during behavioral experiments, the aim is to reduce the perceived threat of structural damage linked to movement and activities, correct unhelpful pain beliefs, provide the participant with a multidimensional understanding of their pain, and identify functional goals for treatment planning; (2) *exposure with control* by gradually exposing the participant to painful, feared, or avoided (valued) activities with body relaxation and without protective behaviors. During this process, expectations about pain and "damage" are challenged and protective pain behaviors during functional movements are discouraged to enhance pain control and increase body confidence and self-efficacy; (3) *lifestyle changes* by encouraging participants to perform physical activity aligned to preference while incorporating newly learned functional strategies (ie, relaxation and movement confidence). Using relaxation strategies to reduce stress and optimizing sleep hygiene will also be coached as indicated. In this study, CFT+ will be delivered by 1 of 2 physical therapists who have extensive training and clinical supervision in CFT, and 1 of 2 pain psychologists who have been trained in the CFT model.[9,17] The role of the psychologist will be to address psychosocial factors identified within the multidimensional clinical reasoning framework as key drivers of ongoing pain or as barriers to engagement in CFT (eg, elevated anxiety or depression, problems in the social environment, motivational barriers) during the joint sessions 1 and 2 (both the physical therapist and the psychologist present).

Participants can be offered the interdisciplinary pain management pathway after CFT+ based on the following criteria: the participant does not feel ready to stop treatment (the participant perspective) AND at least 1 of the following 3 (the health professional perspective) is present: (1) analgesic treatment is inappropriate (use of drug-dependent medication: opioids, benzodiazepines, or cannabis) or secondary analgesics (tricyclic antidepressants or gabapentinoids) have not been tried; (2) the social situation is problematic (uncertain income) and requires attention by a social worker; or (3) psychological distress (significant anxiety, depression, adjustment disorder) is present that requires further treatment by a psychologist. The decision about offering usual care after CFT+ will be based on an interdisciplinary team conference at the Pain Center comprised of a pain physician, a psychologist, a social worker, and the CFT physical therapist or psychologist, and the reasons will be recorded. We expect that approximately 50% of participants randomized to CFT+ will also receive usual care; however, we expect that these participants will need fewer elements from the usual care pathway than participants randomized to usual care.

Interdisciplinary Pain Management Pathway (Usual Care)

Participants who are allocated to the usual interdisciplinary pain management pathway will participate in a program designed to best suit the individual participant's situation, motivation, needs, and resources. This pathway typically includes more than 1 of the following: (1) medical treatment with a specialist pain consultant and a specialist nurse (ie, individualized adjustment of analgesics to improve effect and reduce side effects); (2) individual consultations with a pain psychologist, social worker, or physical therapist with cognitive-behavioral therapy (CBT) or ACT training; and (3) participation in 1 or more group sessions with pain education, strategies for returning to work, relaxation therapy, and mindfulness (content outlined in Tab. 2). In our pilot study, participants received a mean of 16 treatment sessions over a median duration of 9 months.[14] The exact content and amount of treatment sessions will be reported in the primary paper. All clinicians working at the Pain Center have extensive experience working with people in chronic pain.

Similarities and Differences Between the Two Pathways

Both pathways use an interdisciplinary, individualized, participant-centered approach in assessment and management of individuals with cLBP. Education about pain from a biopsychosocial perspective is an important component provided throughout both pathways. In addition to the potential difference in duration (3 months for CFT+ with no need for usual care vs median of 9 months for usual care) due to different content and amount, the interdisciplinary Pain Center pathway primarily targets psychological flexibility through pacing strategies, pain acceptance, and cognitive diffusion[18] providing techniques, such as relaxation, mindfulness, and CBT/ACT-based approaches, to enhance participants' willingness to live with pain and reduce pain-related distress. In contrast, CFT+ specifically challenges participants' unhelpful beliefs about back pain and the body,[19] directly targets unhelpful functional movement behaviors (over-protecting and/or avoiding strategies) through gradual exposure to feared and avoided movements/activities, and teaches new strategies to control pain while engaging in valued activities.

Data Collection Procedure

Questionnaires will be completed via the Pain Center's electronic questionnaire system (PainData, https://www.smerteskema.dk), which is routinely used for the collection of clinical data before and after the course of regular treatment at the Pain Center. It takes approximately 30 minutes to answer the questionnaires. If participants do not complete follow-up questionnaires within 3 days of the scheduled date, they will receive 2 reminders (2 days apart) via e-Boks. To reduce attrition bias, electronic e-Boks letters will be personalized, with a deadline, and a personal signature, and questionnaires will be short, including a statement highlighting the value of their responses.[20] If not completed 2 days after the last reminder, participants will be contacted by a study coordinator. In addition, comprehensive public registry data on medication consumption, number and type of treatments, labor market participation, social benefits, socioeconomic status, education,

Table 1. Overview of the 3-month CFT+ Intervention and CFT+ Related Training Received by the Physical Therapists and the Psychologist[a]

Session	Who Participates	How Much	Key Components
First visit in Pain Center (pre CFT+)	Pain physician Nurse Patient (+1 relative)	60 min	-Interview about pain history, previous and current treatments (pharmacological and non-pharmacological) -Clinical and sensory examination -Record patient's medical story
#1	Physical therapist (lead) Psychologist Patient	90 min	Aim of session: explore patient's full pain history to identify potential contributing factors to their pain condition; identify their goals; assessment of functional behaviors related to painful, feared, or avoided activities; utilize behavioral experiments to reduce fear of movement/activities and enhance pain control; also provide patient with new insight in understanding their pain and disability, greater confidence to engage with valued functional activities, and adopt a healthy lifestyle aligned with their goals. Physical therapist: -Active listening while patient tells their story and physical therapist asks reflective questions regarding beliefs about tissue damage; body posture; protective behaviors; painful, feared, and avoided activities; pain-related emotions; social support; expectations; patient-relevant values and goals -Behavioral experiments with gradual exposure to patient-nominated painful, feared, and avoided activities (eg, forward bending, lifting) with body relaxation (eg, through diaphragmatic breathing) with aim of building confidence and self-efficacy to perform provocative/feared/avoided activities without protection and with pain control -Identify, describe, and challenge potential discrepancies in patient's beliefs (eg, "I must brace my core to protect my back when I bend") and the experience during exposure (eg, "It hurts less when I bend with relaxed abdominals and back muscles") -Make sense of pain by using patient's own story and experience during behavioral experiments to reduce perceived threat of structural damage, challenge unhelpful pain beliefs, and provide patient with new understanding of their pain. This is supported visually by drawings that patient can take home. -Encourage patient to reflect on new information and experiences during exposure activities during next week -Encourage patient to perform physical activity/exercises based on their preference, goals, and newly learned strategies to link exposures to valued activities and goals -Provide self-management program including cognitive restructuring, progressive functional exercises, and lifestyle changes individualized to patient's goals -Build body-trust and self-efficacy -Provide written resources [eg, 18] to be read and a goal-setting form for patient to fill in for 2nd session -Home exercise program (written or videoed on patient's phone): relaxation techniques, goal-orientated functional exercises, while controlling pain behaviors integration of new behaviors into daily activities, graded physical activity based on preference Psychologist: Main aims of having psychologist present during first session are to: •Make assessment more efficient, avoid patient having to tell their story twice •Create consistency in messages to patient •Give the psychologist insight into behavioral experiments and exposure activities undertaken so they can discuss this later with patient and explore their cognitive and emotional responses to these activities •Convey a message of unity and shared understanding/goals to patient •Develop trust with psychologist to facilitate early integration of co-care. Often patients can be reluctant to engage with the psychologist because of stigma and uncertainty, so being able to meet psychologist early can remove this barrier
After 1st session			-Based on multidimensional clinical reasoning framework in CFT model, physical therapist and psychologist complete shared treatment plan and agree on areas each of them will target in session 2

(*Continued*)

Table 1. Continued

Session	Who Participates	How Much	Key Components
#2 (1 wk after 1st session)	Session lead by both physical therapist (begin) and psychologist (ends) Patient	90 min	Aim of session: Explore patient's experience and thoughts related to initial session, discuss goals, reinforce new understanding of pain, reinforce new functional behavior, further integrate new behaviors into valued functional tasks and daily activities and further explore psychological dimension of pain and barriers to recovery Physical therapist: -Ask question about new understanding of patient's pain and their experience/concerns with physical activity/exercises performed since first session -Discuss short- and long-term goal setting -Repeat exposure activities with gradual exposure from session 1 to promote behaviors that control pain and confident engagement in functional tasks -Reinforce cessation of protective behaviors -Progress functional tasks in line with patient's valued goals -Home exercise program: progress relaxation techniques, functional exercises, functional activation, graded physical activity based on preference Psychologist: -Validate and normalize patient's experience as part of "making sense" and de-threatening process -Explore patient's subjective experiences during exposure activities to provide an "in the moment" insight into patient's pain response to address and illustrate interactions between cognitions, emotions, bodily sensations, and behavior (CBT) (eg, "when you try to relax your belly and breathe, what goes through your mind", "what's it like to feel that?", "what feelings come up?", "what are you feeling in your body right now?", "what do you feel like doing when you feel this way?") -Identify and address experiential avoidance, build self-efficacy around patient's ability to tolerate uncomfortable experiences -Identify potential barriers for adherence to intervention such as negative cognitions and coping strategies (eg avoidance and endurance strategies), pain-related worries and distress, and stressful life events (unhealthy relationships, family conflicts, stressful workplace, social isolation) -Identify and address emotional dimension of the disorder if patient presents with significant pain-related distress (stress, anxiety, depression, PTSD)

(*Continued*)

Table 1. Continued

Session	Who Participates	How Much	Key Components
Up to 5 sessions	Physical therapist Patient	30–60 min	Aim of sessions: Consolidate pain self-management through consolidating insight, new beliefs and behaviors, lifestyle, body-trust, and self-efficacy to obtain valued goals. Where indicated, strength and conditioning exercises are incorporated into program. These new skills are then generalized to activities of daily living nominated by patient as aligned to their goals -Focus on strong therapeutic alliance, building trust -Reinforce new biopsychosocial multidimensional understanding of pain -Reinforce cessation of protective behaviors -Progressively load patient-valued but feared activities to build confidence and physical strength (start small, practice consistently, increase challenge over time) -Graded shift from clinician-informed strategies to gain pain control to patient-reflected strategies (problem-solving) -Encourage participation in valued activities -Discuss work situation and possible contact to workplace or social case work -Discuss plan for episodes with pain exacerbations -If no positive progression, then re-evaluate potential barriers and adjust strategies -Home exercise program: progress functional tasks and relaxation techniques, functional activation, strength and conditioning exercises as indicated and linked to goals, and graded physical activity based on preference -Discuss long-term goal setting, confidence with self-management and pain exacerbation plan
Up to 3 sessions	Psychologist Patient	45–60 min	-Address in more detail psychosocial factors identified as important drivers of pain in shared formulation after session 1 as well as barriers identified in session 2 -Develop strategies for identified goals
After 5th session	Physical therapist Psychologist	15 min	Shared formulation and treatment plan is reviewed and updated if necessary
Profession			Training received in relation to CFT+ pathway
Physical therapists			Both physical therapists participated in several CFT workshops with developers of CFT approach. Both physical therapists have used CFT in clinical practice for almost 10 years. They have >150 h of supervision within group of physical therapists with CFT training in Denmark.
Psychologists			Pain psychologists have been trained in CFT model through workshops and reading material over 12-month period before being part of trial and have participated in >5 patient workshops with CFT physical therapists. They also have psychological competencies in assessment, treatment formulation, and intervention using cognitive behavioral principles as well as profound understanding of pain science and experience working with people in chronic pain.

[a] CFT = cognitive functional therapy.

Table 2. Overview of the Elements in the Interdisciplinary Pain Management Approach[a]

Elements	Who Participates	How Much	Key Components
First visit in Pain Center	Pain physician Nurse Patient (+ 1 relative)	60 min	-Interview about pain history, previous and current treatments (pharmacological and non-pharmacological) -Clinical and sensory examination -Record patient's medical story
Medical treatment	Pain physician Nurse Patient	2–5 face to face sessions (30 min/session) 2–5 telephone sessions (15–30 min/session)	-Individual adjustment of analgesics to improve effect and reduce side effect -Discontinue paracetamol and non-steroidal anti-inflammatory drugs -Change from short- to long-acting opioids if patient already uses opioids -Discuss and encourage discontinuation of drug-dependent medication (opioids, benzodiazepines, and cannabis) -Possibly try secondary analgesics (tricyclic antidepressants, gabapentinoids) or muscle relaxants
Opioid discontinuation group sessions	Psychologist Nurse Patients (×6)	5 sessions of 90 min/session over 10 wk	-Motivation for opioid discontinuation -Identify withdrawal symptoms -Plan for relapse -Relaxation exercises
Introduction to psychosocial contributors to pain	Pain physician or Social worker Patients (×15) + relatives	1 session 90 min	-What is chronic pain -Impact and consequences of chronic pain (a biopsychosocial perspective) -Introduction to cognitive diamond (interactions between cognitions, emotions, bodily sensations, and behavior) -Rationale for treatment targeting psychosocial contributors
One or more individual sessions with a psychologist	Psychologist Patient	60 min/session	-Validating and normalizing the patient's experience -Identify the need for psychological pain coping strategies (in individual or group setting) in the Pain Center or with external psychiatric settings (if severe psychiatric pathology is present) -Psychological pain management addresses strategies, values and goals (done within a cognitive or behavioral therapeutic approach; ACT and CBT). -Consider referral for group sessions: "Cope with chronic pain," "Mindfulness Based Stress Reduction," or "Relaxation."
One or more individual sessions with a social worker	Social worker Patient	60 min/session	-Validate and normalize patient's experience -Education on social legislation and different possibilities related to patient's social situation -Help patient identify and refine work-related goals based on their values -Identify barriers for return to work -Discuss their work situation and possible contact to workplace or social worker in municipality
One or more individual sessions with a physical therapist	Physical therapist Patient	60 min/session	-Validate and normalize patient's experience -Help patient identify and refine physical activity goals based on patient values -Identify barriers for physical activity -Exercises with Body Awareness Therapy
Coping with chronic pain (group sessions) Precedes other group sessions	2 health care professionals (mixed between social worker, nurse, psychologist, pain physician, physical therapist) trained in CBT and/or ACT Patients (×10–14)	6 sessions (150 min/session) over 6 wk	-What is chronic pain? -Impact and consequences of chronic pain (a bio-psycho-social perspective) -Introduction to cognitive model (interactions between cognitions, emotions, bodily sensations, and behavior) and schemata -Acceptance and willingness to live with pain -Assessing values and setting value-based goals -"Boom bust" behavior and pacing strategies -How to deal with pain exacerbations -How to communicate about pain with others -Several reflective exercises during group sessions and at home

(*Continued*)

Table 2. Continued

Elements	Who Participates	How Much	Key Components
Pain and work (group sessions)	2 social workers Patients (×8) on sick leave or with problematic work situation (uncertain income)		-Introduction to social service law and occupational rehabilitation -Address and identify worries, expectations, goals, and values in relation to work -Reflect on and identify new possibilities (eg, internship, workplaces) -Design a tangible plan -Several brief relaxation and breathing exercises during group sessions and at home
Relaxation/visualization therapy (group sessions)	2 Health care professionals (mixed between social worker, nurse, psychologist, pain physician, physical therapist) trained in relaxation/visualization therapy and CBT Patients (×15)	5 sessions (150 min/session) over 5 wk	-Rationale for relaxation (nervous system, muscle tension, stress mechanisms, and sleep in chronic pain) -Cognitive model (interactions between cognitions, emotions, bodily sensations, and behavior) -Body awareness and bodily sensations -Acceptance of body and self -Several relaxation, visualization, and reflection exercises during group sessions and at home
Mindfulness Based Stress Reduction (group sessions)	Psychologist (led by) Social worker Both health care professionals are certified MBSR teachers Patients (×18)	10 sessions (150 min/session) over 10 wk Includes 1 full day (7.5 h) of silence retreat	Based on the 2017 protocol from Center for Mindfulness in Medicine, Health Care and Society, University of Massachusetts Medical School -Introduction to mindfulness, theoretical rationale for the mind–body connection -Mindful activities (eating, yoga, breathing, body scan etc) -Meditation (lying, sitting, yoga) -Different themes: eg, awareness, accept, stress/stressors, bodily sensations, cognitions and emotions, difficult communication -Integration of mindfulness in daily life -Daily mindfulness exercises (access to audio files) -Reflection on homework and mindfulness practice
Pain and sleep (group sessions)	Pain physician Patients (×15)	1 session 90 min	-Interactions between sleep and pain -Fatigue, restless legs, and sleep apnea -Attitudes and beliefs about sleep and pain -Eeffect of medication on sleep -How to improve sleep (principles for better sleep hygiene) -Individual follow-up by nurse
Pain and intimacy (group sessions)	Nurse Patients (×10)	1 session 120 min	-Introduction about intimacy and chronic pain (common loss and consequences) -Unhelpful cognitions and behaviors -Effect of medication on intimacy -How to work with intimacy (reflective exercises)
Pain and family relations (group sessions)	Psychologist Patients (×10)	1 session 120 min	-Chronic pain: part of the family -Unhelpful strategies -Communication: when, where, and how -Common values and goals

[a] CBT = cognitive behavioral therapy.

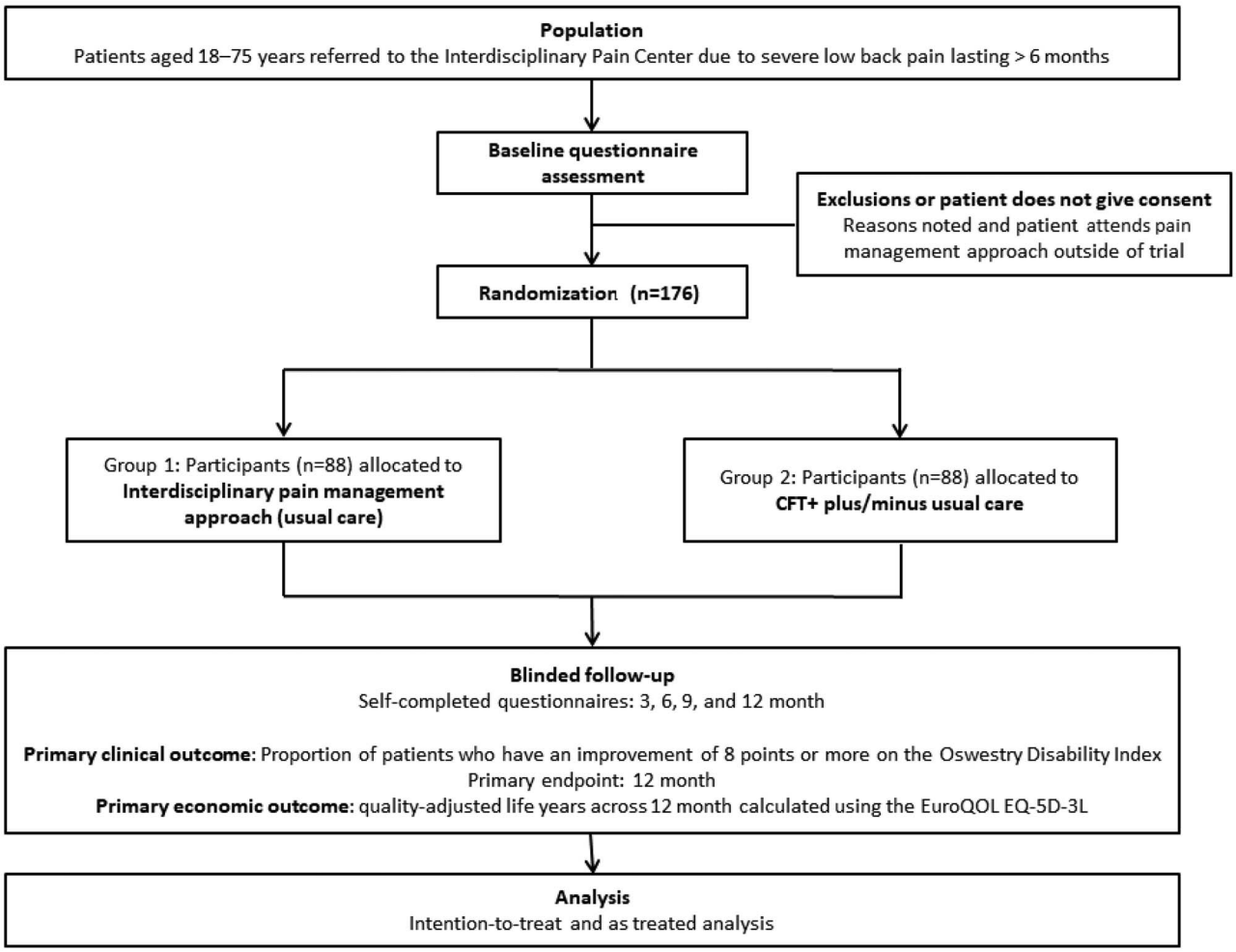

Figure. Flow chart.

and any cause of death will be retrieved after the 12 months of follow-up. The outcome assessor is blinded to pathway allocation.

Outcomes

A detailed description of the data collected at each time point is presented in Table 3.

Primary Outcome

The proportion of participants who have an improvement of 8 points or more on the Oswestry Disability Index (ODI)[21,22] at 12 months is the primary outcome. The ODI assesses pain-related disability within the last 7 days, asking participants to reflect on their ability to manage their everyday life despite their back pain for these domains: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life, and travelling. Each domain is scored on a 0 to 5 scale. The index is calculated by dividing the summed score by the total possible score multiplied by 100 and expressed as a percentage, with 100 representing the greatest disability.

Secondary Outcomes

- ODI score[21,22]
- Average pain intensity during the last 24 hours (assessed with a 0–10 numerical rating scale)[23]
- Pain catastrophizing (assessed with the Pain Catastrophizing Scale)[24]
- Pain self-efficacy (assessed with the 2-item Pain Self-Efficacy Questionnaire)[25]
- Participant-perceived global improvement assessed using a tailored question based on the Kamper et al recommendations[26]
- Participant satisfaction with care and treatment assessed using a tailored question based on Rofail et al[27]
- Use of analgesics
- Direct health costs attributable to consumption of health care resources (obtained from linking the trial data to Danish public registries)
- Economic evaluation (the cost per quality adjusted life year utilizing the responses from the 3-level version of the EuroQOL EQ-5D questionnaire for the utility weights)
- Patient Enablement Instrument for Back Pain

Adverse Reactions

Adverse reactions are defined as any undesirable experience during the trial leading to contact with the health care system (general practitioner, emergency room, or hospital). Adverse reactions are assessed at 3, 6, 9, and 12 months by asking the participant to report the occurrence of any adverse reactions during the last 3 months. Due to the very low risk of adverse events, there is no discontinuation rule for the trial.

Table 3. Overview of Trial Data Collection

Construct	Measure	Baseline	3 Months	6 Months	9 Months	12 Months
Age	Date of birth (CPR-number)	X				
Sex	Female/male (CPR-number)	X				
Height	cm	X				
Weight	kg	X				
Smoking status	Categorical	X				
Alcohol status	Categorical	X				
Comorbidities	Yes/no	X				
Education	Categorical	X				
Work situation	Categorical	X				
Current sick leave	Yes/no	X	X	X	X	X
Prior treatments for pain	Yes/no	X				
Use of analgesics	Yes/no	X	X			X
Pain distribution	Pain drawing on body chart	X				
Depression	Patient Health Questionnaire 9-items (PHQ9)	X				
Anxiety	Generalized Anxiety Disorder (GAD7)	X				
Kinesiophobia	Tampa Scale of Kinesiophobia (TSK-17)	X				
Pain Catastrophizing	Pain Catastrophizing Scale (PCS)	X				X
Patient enablement	Patient Enablement Instrument for Back Pain asking participants to indicate on an 11-point numerical rating scale, ranging from 0–10 (0 = to a very low degree and 10 = to a very high degree) the degree to which they during the past week were able to (1) cope with life, (2) understand their back problem, (3) cope with their back problem, (4) keep their back healthy, (5) feel confident about their health, and (6) help themselves	X	X			X
Pain self-efficacy	Pain self-efficacy questionnaire (PSEQ-2)	X				X
Pain intensity	0–10 Numeric Pain Rating Scale	X	X	X	X	X
Pain-related activity limitation	Oswestry Disability Index (ODI)	X	X	X	X	X
Health-related quality of life and quality-adjusted life years	EuroQOL EQ-5D-3L	X	X	X	X	X
Patient-perceived global rating of improvement	The Patient Global Impression of Change (PGIC) scale using Likert scale responses (1 = much worse, 2 = worse, 3 = a little worse, 4 = neither worse nor better, 5 = a little better, 6 = better, 7 = much better)		X			X
Patient-perceived global rating of satisfaction with treatment	Global satisfaction with treatment using Likert-type scale responses (1 = very dissatisfied, 2 = dissatisfied, 3 = neither dissatisfied nor satisfied, 4 = satisfied, 5 = very satisfied).		X			X
Direct health costs attributable to consumption of health care resources	Extracts from public registries					X
Adverse reactions	Tailored open questions		X	X	X	X

Sample Size

The study is designed to detect a difference in the proportion of participants who have an improvement of 8 points or more on the ODI at 12 months between the 2 pathways. An 8-point difference is the minimal important clinical difference for participants with severe cLBP.[28] Based on our CFT pilot study,[14] 40% to 45% of participants reported an improvement of 8 points or more. We expect this to rise to 50% after CFT+. Based on data from our clinical pain registry,[29] 24% of participants who received the usual care pathway from 2015 to 2019 reported being better or much better immediately after treatment. We expect that 25% in this group will have a change of 8 points or more at 12 months. To detect this difference, 74 participants in each pathway are needed (assuming a power of 0.90 and alpha level of .05). To account for a drop-out of participants up to 15%, we plan to recruit 176 participants (88 in each group). If the intended sample size is not reached at 30 months after recruitment has started, the inclusion of participants will stop at 130 participants, which will ensure a power of 80%.

Statistical Analysis

Participant characteristics at baseline will be reported with descriptive statistics as means and SDs, median and interquartile range, or numbers and percentages as appropriate.

Main Analysis on the Primary Outcome

Using intention-to-treat, the primary outcome at 12 months in the 2 pathway groups will be compared using a 2-sample test of proportions. The difference in proportions between groups will be reported with associated 95% CI and *P* value. Numbers needed to treat will be reported to improve how results are interpreted.

Exploratory Analyses

Differences in ODI score trajectories from baseline to 12 months including all time points (ie, 3, 6, 9, and 12 months) between the 2 treatment pathways will be explored using mixed-linear effect models with participant as a random effect, time (3, 6, 9, and 12 months) and group as fixed effects, and baseline ODI score as covariate. Differences in the ODI score between groups at each time point will be reported with associated 95% CI and *P* value. All other secondary outcome measures will be evaluated using equivalent linear mixed models for the collected time points.

Analysis of health costs between the 2 pathways (intention-to-treat) will be performed using the 12-month follow-up data. Incremental cost-effectiveness ratios will be calculated to determine cost per quality adjusted life year gained, and modeling projections will be made to estimate the longer-term cost-effectiveness of the pathways. Incremental cost-effectiveness ratio is the ratio of change in costs and to change in effectiveness of the pathway. Sample uncertainty will be examined using bootstrapping techniques. The cost–benefit trade-off will be discussed.

In addition, an exploratory analysis using as-treated principles (CFT+ minus usual care pathway, CFT+ plus usual care pathway, and usual care pathway) will explore how the group receiving CFT+ plus usual care performed over time. A detailed statistical analysis plan will be publicly available before unblinding the data, and any statistical analyses are performed by a statistician blinded to group allocation.

Role of the Funding Source

The investigators have no connection to any sponsors and there are no financial conflicts of interest.

Ethics

The study protocol has been approved by the ethical committee (S-20190131). The pathways described have minimal risk of adverse reactions, take place according to the usual clinical procedures, and are used only for people who speak and understand Danish so that there are no language uncertainties in connection with the information provided. No placebo treatment is provided. The study will have no influence on the treatment in the Pain Center for those participants who do not consent. The collected trial data will be protected in accordance with the "Act on the Processing of Personal Data" (Act No. 429 of 31/05/2000) and the "Law on the Status of Patients" (Act No. 482 of 01/07/1998). Participants' personal data will be protected in accordance with the Personal Data Processing Act and the Health Act. The duration of data retention will be in accordance with notification to the Danish Data Inspectorate.

Discussion

Impact and Significance of Study

The study evaluates the effectiveness of a physical therapy–led CFT+ plus/minus usual care pathway for participants with high-impact cLBP that have had an unsatisfactory response to primary care treatment compared with the often-lengthy usual care pathway. The results will provide important knowledge about the effects of a brief CFT+ pathway. In this severely affected population, cost-effective pathways are important, and the findings can influence future care and reduce cost for the health care system.

Strengths and Limitations

This study is a fully powered RCT with participant blinding and a relatively long follow-up. Although the treatment setting and participant blinding are important elements in this trial, there is a potential a risk of contamination due to both pathways occurring within the same Pain Center. To mitigate this risk, CFT physical therapists will not participate in conferences discussing participants allocated to the usual care pathway. In addition, the inability to blind treating clinicians to group allocation and the possibility that participants can be unmasked if they gain access to this published protocol are limitations.

Author Contributions

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Ethics Approval

The study protocol has been approved by the ethical committee (S-20190131).

Clinical Trial Registration

The study is registered at ClinicalTrials.gov (NCT04399772). This study will not have a formal data monitoring committee, and no trial audit is planned as this trial does not investigate drugs or products. Adverse reactions will be discussed by all authors.

Disclosures and Presentations

P.O'S. and K.U. occasionally receive payments for clinical workshops on cognitive functional therapy (CFT). The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no other conflicts of interest. Results will be published in peer-reviewed scientific journals, presented at conferences, communicated to patient organizations, and reported in social media.

References

1. Hartvigsen J, Hancock MJ, Kongsted A, et al. What low back pain is and why we need to pay attention. *Lancet*. 2018;391:2356–2367.
2. Vos T, Flaxman AD, Naghavi M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012;380:2163–2196.
3. Pagé MG, Boyd K, Ware MA. Examination of the course of low back pain intensity based on baseline predictors and health care utilization among patients treated in multidisciplinary pain clinics: a quebec pain registry study. *Pain Med*. 2019;20:564–573.
4. Chou R, Huffman LH. Nonpharmacologic therapies for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of Physicians clinical practice guideline. *Ann Intern Med*. 2007;147:492–504.
5. Oliveira CB, Maher CG, Pinto RZ, et al. Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview. *Eur. Spine J*. 2018;27:2791–2803.
6. Kamper SJ, Apeldoorn AT, Chiarotto A. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis. *BMJ*. 2015;350:h444.
7. Fashler SR, Cooper LK, Oosenbrug ED. Systematic review of multidisciplinary chronic pain treatment facilities. *Pain Res Manag*. 2016;2016:5960987.
8. Thomsen AB, Sørensen J, Sjøgren P, Eriksen J. Economic evaluation of multidisciplinary pain management in chronic pain patients: a qualitative systematic review. *J Pain Symptom Manage*. 2001;22:688–698.
9. O'Sullivan PB, Caneiro JP, O'Keeffe M, et al. Cognitive functional therapy: an integrated behavioral approach for the targeted management of disabling low back pain. *Phys Ther*. 2018;98:408–423.
10. Vibe Fersum K, O'Sullivan P, Skouen JS, Smith A, Kvale A. Efficacy of classification-based cognitive functional therapy in patients with non-specific chronic low back pain: a randomized controlled trial. *Eur J Pain*. 2013;17:916–928.
11. O'Keeffe M, O'Sullivan P, Purtill H, Bargary N, O'Sullivan K. Cognitive functional therapy compared with a group-based exercise and education intervention for chronic low back pain: a multicentre randomised controlled trial (RCT). *Br J Sports Med*. 2020;54:782–789.
12. Vibe Fersum K, Smith A, Kvåle A, Skouen JS, O'Sullivan P. Cognitive functional therapy in patients with non-specific chronic low back pain-a randomized controlled trial 3-year follow-up. *Eur J Pain*. 2019;23:1416–1424.
13. Ussing K, Kjaer P, Smith A, et al. Cognitive functional therapy for people with nonspecific persistent low back pain in a secondary care setting-a propensity matched, case-control feasibility study. *Pain Med*. 2020;21:2061–2070.
14. Vaegter HB, Ussing K, Johansen JV. Improvements in clinical pain and experimental pain sensitivity after cognitive functional therapy in patients with severe persistent low back pain. *Pain Rep*. 2020;5:e802.
15. Dorflinger L, Kerns RD, Auerbach SM. Providers' roles in enhancing patients' adherence to pain self management. *Transl Behav Med*. 2013;3:39–46.
16. Koes BW, van Tulder MW, Thomas S. Diagnosis and treatment of low back pain. *BMJ*. 2006;332:1430–1434.
17. Caneiro JP, Smith A, Rabey M, Moseley GL, O'Sullivan P. Process of change in pain-related fear: clinical insights from a single case report of persistent back pain managed with cognitive functional therapy. *J Orthop Sports Phys Ther*. 2017;47:637–651.
18. Zhang CQ, Leeming E, Smith P. Acceptance and commitment therapy for health behavior change: a contextually-driven approach. *Front Psychol*. 2017;8:2350.
19. O'Sullivan PB, Caneiro JP, O'Sullivan K. Back to basics: 10 facts every person should know about back pain. *Br J Sports Med*. 2020;54:698–699.
20. Fairbank JC, Couper J, Davies JB, O'Brien JP. The Oswestry Low Back Pain Disability Questionnaire. *Physiotherapy*. 1980;66:271–273.
21. Edwards PJ, Roberts I, Clarke MJ, et al. Methods to increase response to postal and electronic questionnaires. *Cochrane Database Syst Rev*. 2009;3:Mr000008.
22. Fairbank JC, Pynsent PB. The Oswestry Disability Index. *Spine (Phila Pa 1976)*. 2000;25:2940–2952 Discussion 2952.
23. Cleeland CS, Ryan KM. Pain assessment: global use of the Brief Pain Inventory. *Ann Acad Med Singapore*. 1994;23:129–138.
24. Sullivan MJ, Bishop SR, Pivik J. The pain catastrophizing scale: development and validation. *Psychol Assess*. 1995;7:524–532.
25. Nicholas MK, McGuire BE, Asghari A. A 2-item short form of the Pain Self-efficacy Questionnaire: development and psychometric evaluation of PSEQ-2. *J Pain*. 2016;16:153–163.
26. Kamper SJ, Maher CG, Mackay G. Global rating of change scales: a review of strengths and weaknesses and considerations for design. *J Man Manip Ther*. 2009;17:163–170.
27. Rofail D, Myers L, Froggatt D. Treatment satisfaction and dissatisfaction in chronic low back pain: a systematic review. *J Psychol Psychother*. 2016;6. Accessed June 5, 2020. doi: 10.4172/2161-0487.1000260.
28. Lauridsen HH, Hartvigsen J, Manniche C, Korsholm L, Grunnet-Nilsson N. Responsiveness and minimal clinically important difference for pain and disability instruments in low back pain patients. *BMC Musculoskelet Disord*. 2006;7:82.
29. Vaegter HB, Christoffersen LO, Enggaard TP, et al. Sociodemographics, pain characteristics, quality of life and treatment values before and after specialized interdisciplinary pain treatment: results from the Danish Clinical Pain Registry (PainData). *J Pain Res*. 2021;14:1215–1230.