

Psychological Treatment Strategy for Chronic Low Back Pain

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Abstract:

Studies have indicated that chronic low back pain (LBP) should be approached according to its morphological basis and in consideration of biopsychosocial interventions. This study presents an updated review on available psychological assessments and interventions for patients with chronic LBP. Psychosocial factors, including fear-avoidance behavior, low mood/withdrawal, expectation of passive treatment, and negative pain beliefs, are known as risk factors for the development of chronic LBP. The Örebro Musculoskeletal Pain Questionnaire, STarT Back Screening Tool, and Brief Scale for Psychiatric Problems in Orthopaedic Patients have been used as screening tools to assess the development of chronicity or identify possible psychiatric problems. The Pain Catastrophizing Scale, Pain Self-Efficacy Questionnaire, and Injustice Experience Questionnaire are also widely used to assess psychosocial factors in patients with chronic pain. With regard to interventions, the placebo effect can be enhanced by preferable patient-clinician relationship. Reassurance to patients with non-specific pain is advised by many guidelines. Cognitive behavioral therapy focuses on restructuring the negative cognition of the patient into realistic appraisal. Mindfulness may help improve pain acceptance. Self-management strategies with appropriate goal setting and pacing theory have proved to improve long-term pain-related outcomes in patients with chronic pain.

Keywords:

Chronic pain, Low back pain, Psychosocial strategy

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Introduction

Low back pain (LBP) is a major public health problem worldwide. Diagnosing the cause of LBP, which is usually defined as pain localized below the costal margin and above the inferior gluteal folds, is essential to the triage of patients with specific or non-specific LBP¹⁾. Regardless of the established guideline for treating LBP¹⁾, approximately 5% to 10% of LBP may develop into chronic conditions after various interventions²⁻⁴⁾. Studies using imaging to identify the morphological pathology of LBP have reported high rates of false-positive results⁵⁾. Inoue et al. reported that approximately 20% patients who underwent lumbar surgery have residual symptoms, among which pain is the most prevalent⁶⁾. A recent report in Japan has indicated that psychosocial factors are critical to the development of chronic, disabling LBP⁷⁾. As such, chronic LBP should be approached

by considering not only its morphological basis but also its biopsychosocial interventions⁸⁻¹⁰⁾.

Brox et al. reported that lumbar fusion surgery for chronic LBP after a previous surgery is no more effective than cognitive intervention¹¹⁾, indicating that clinicians should recognize the importance of biopsychosocial interventions and identify the fundamental technique for treating patients with chronic LBP. However, few facilities in Japan can provide biopsychosocial interventions for chronic pain, and thus, the standard technique of psychological intervention for chronic pain seems to be lacking among Japanese clinicians¹²⁾. In the present work, we present an updated review as keynote on the available psychological assessments and interventions for patients with chronic LBP.

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Table 1. Screening Tool of Psychosocial Factors Associated with Chronic Low Back Pain.

Questionnaire (abbreviation)	Evaluation issues	Interpretation
<i>Örebro Musculoskeletal Pain Questionnaire (ÖMPQ)</i> <i>ÖMPQ original 21-item</i> <i>ÖMPQ-12 short form</i>	Psychosocial factors	A total score ≥ 114 indicates high risk of chronicity A total score ≥ 72 indicates high risk of chronicity
<i>STarT Back Screening Tool</i>	Psychosocial factors	A total score ≥ 4 with a psychosocial score ≥ 4 is high-risk of chronicity
<i>Brief Scale for psychiatric problem in Orthopaedic Patients (BS-POP)</i>	Psychiatric problems	Possible psychiatric problem: A score ≥ 11 physician version points or A score ≥ 10 physician version points with a score ≥ 15 patient version points.
<i>Pain catastrophizing scale (PCS)</i>	Catastrophic thought for pain	Higher score indicates having higher catastrophizing thoughts (negative outcome).
<i>Injustice Experience Questionnaire (IEQ)</i>	Feeling of Injustice	Higher score indicates having higher injustice feelings (negative outcome).
<i>Pain Self-Efficacy Questionnaire (PSEQ)</i>	Self-confidence to cope with pain	Higher score indicates having higher self-confidence (positive outcome).

Psychological Treatment Strategy

1. Assessment of physical problems and disabilities

Prior to psychological assessment, it is essential for the clinicians to reevaluate physical problems to avoid overlooking red flags or organic diseases. Nonetheless, it seems inevitable that diagnostic errors often occur because of cognitive biases, such as availability, representativeness, confirmation bias, and premature disclosure¹³. For example, although vertebral fracture is one of prevalent causes of LBP, it is often overlooked¹⁴. An early intervention for osteoporosis with fragile vertebral fractures can be useful for preventing the development of chronic LBP¹⁵. While treatable organic diseases are sufficiently intervened, clinicians simultaneously need to assess the disabilities and quality of life (QOL) of patients with chronic LBP because improvements in disabilities are considered an important outcome among chronic pain patients¹⁶. The Roland Morris Disability Questionnaire^{17,18}, Oswestry Disability Index^{19,20}, and Pain Disability Assessment Scale^{21,22} are often used as assessment tools regarding disabilities in patients with chronic LBP.

2. Assessment of psychological risk factors

Psychosocial factors, including fear-avoidance behavior, low mood/withdrawal, expectation of passive treatment, and negative pain beliefs such as catastrophizing, have been known to be risk factors for the development of chronic LBP²³⁻²⁵, also known as “yellow flags” (Table 1). Linton et al. introduced the Örebro Musculoskeletal Pain Questionnaire (ÖMPQ) to assess psychosocial factors associated with acute LBP, and this questionnaire has been shown to be effective in predicting LBP chronicity²⁶. As for a Japanese version of ÖMPQ, a short version of ÖMPQ was recently introduced²⁷. In terms of clinical cut-off point, a total score of ≥ 72 in the ÖMPQ-12 short form or ≥ 114 in the ÖMPQ original 21-item form indicates a high risk of absenteeism or

functional impairment, respectively^{28,29}. Alternatively, Hill et al. introduced the Keele STarT Back Screening Tool to identify prognostic indicators to classify patients with poor prognoses³⁰. A stratified approach using this screening was associated with a mean increase in generic health and cost savings³¹. Matsudaira et al. evaluated the validity of the Japanese version of STarT Back Screening (STarT-J) in patients with LBP^{32,33}, and they reported the efficacy of STarT-J in predicting pain and disability outcomes after six months in patients with LBP³⁴. This tool classifies patients into three risk groups based on scores on nine overall items and five psychosocial subscales as follows: the low-, medium-, and high-risk groups for those earning the total scores of 0-3, ≥ 4 (and psychosocial score of ≤ 3), and ≥ 4 (and psychosocial score of ≥ 4), respectively³⁴. For patients in the high-risk group, cognitive behavioral therapy (CBT), in combination with physical therapy, is recommended³⁵.

In addition, pain catastrophizing, pain coping skills, self-efficacy, and perceived injustice are known to be important psychometric properties associated with pain-related outcomes in patients with chronic pain³⁶⁻³⁸, and over 1,000 international studies have documented a relationship between pain catastrophizing and adverse pain outcomes³⁹. The Pain Catastrophizing Scale (PCS)⁴⁰, Pain Self-Efficacy Questionnaire (PSEQ)⁴¹, and Injustice Experience Questionnaire (IEQ)³⁸ are widely used to assess the psychosocial aspects of chronic pain patients worldwide, and their Japanese versions have been introduced and validated⁴²⁻⁴⁵.

Meanwhile, traditional psychiatric problems, such as anxiety and depression, are well known to be associated with sustained LBP⁴⁶. Japanese orthopedic physicians have originally proposed the Brief Scale for Psychiatric problems in Orthopaedic Patients (BS-POP) to assess psychiatric problems in patients with LBP^{47,48}. BS-POP includes questionnaires for both physicians and patients, and its clinical cut-off point to suspect psychiatric problem is set at ≥ 11 physician version points and ≥ 10 physician version points with \geq

Negative thought	Cognitive appraisal
<ul style="list-style-type: none"> • When will this pain stop? • Nothing seems to work. • There's no way. • I'm useless. • It's hopeless. • No one understand. • Why don't they understand? • I don't want to do anything. 	<ul style="list-style-type: none"> • The pain is temporary, will pass. • I've experienced this before. • It's nothing new. • I could cope with pain before. <hr style="border-top: 1px dashed black;"/> <p style="text-align: center; color: #4F81BD;"><i>Exercise yourself</i></p>

Figure 1. Challenging ways to think about pain.

15 patient version points. Orthopedic surgeons are recommended to consult with a psychiatrist when a patient has a high BS-POP score; a multidisciplinary approach is also considered wise⁴⁷.

3. Psychotherapeutic approach

(1) Patient-clinician relationship and clinician's attitude

Patient-clinician relationship, particularly rapport building, plays an important role in treatment outcomes in patients with chronic pain⁴⁹. A recent review implied that the placebo effect can be enhanced by patient-clinician relationship⁵⁰. Patient satisfaction is positively associated with affiliative behaviors, such as forward-leaning posture, smiling, nodding, and a relatively high-pitched vocal tone, and negatively associated with physician control⁵¹. Patient-centered support, including psychological support, promotion of patient's health literacy, and empowerment of patients to cooperate in finding the correct treatment, can increase the resilience of patient with chronic pain⁵². Clinicians' empathy has an important role to influence outcome in patients with chronic pain⁵³. An experimental study showed that participants who stated feeling more trust toward their clinician reported less pain in response to painful stimuli⁵⁴, suggesting that trustworthiness can be an important factor to positive outcomes in patients with chronic pain⁵⁵.

(2) Reassurance

Reassurance is the removal of fears and concerns in patients with illness. Many guidelines advice the delivery of reassurance to patients with non-specific pain, including LBP^{56,57}. The concept of reassurance aligns with the fear-avoidance model: excessive worry for pain leads patients into a vicious circle of chronic pain⁵⁸. Pincus et al. proposed a theoretical model of reassurance comprising affective and cognitive components⁵⁹. Affective reassurance aims to build

patient-clinician relationship, which is associated, at best, with improved short-term outcomes, and at worst, with poorer outcomes. By contrast, cognitive reassurance aims to improve the patient's knowledge and understanding of their health problem for reducing their worries, which can improve outcomes in both the short and long term⁵⁹.

(3) Cognitive behavioral therapy (CBT)

CBT, a form of psychological therapy, has been widely utilized in the treatment of chronic LBP⁶⁰. In recent trend of behavioral medicine intervention, CBT has been recognized as a second-generation behavioral therapy⁶¹. According to a recent systematic review, CBT significantly improves disability and pain catastrophizing in patients with chronic pain after treatment and at follow-up⁶². As negative and catastrophic thoughts are highly correlated to pain complaints⁶³, CBT focuses on restructuring the negative cognition of the patient into a realistic appraisal. When a realistic appraisal can be gained, the patient may be able to cope with their pain. For example, in patients with chronic LBP with unidentified pathologies, a patient's negative thought of "Pain lasts for several months, but no treatment works for me, and so I feel awful" can be replaced by "I had many experiences of this kind of pain, but my body has been working well and I could get through every time" (Fig. 1). However, these educational suggestions should be provided by skilled practitioners with abundant CBT experience. Otherwise, an insufficient technique may cause a broken relationship between the patient and the clinician. Meanwhile, homework assignments between therapy sessions are an essential component of CBT. Homework should start with easy items at the first stage to build up confidence. Otherwise, patients may be discouraged and would not participate in further therapy⁶⁴.

My goal – What do I want to achieve? Be specific	
Why do I want to achieve this goal? What are the benefit?	
Challenges – What will make this difficult? (e.g. practical challenges, concerns)	
Strategies to overcome challenges– (e.g. planning, pacing, mindfulness, helpful thoughts)	
Short term	Long term

Figure 2. Goal setting over 1-week and 3-month periods.

(4) Acceptance and commitment therapy (ACT) and mindfulness

A third-generation behavior therapy is called acceptance and commitment therapy (ACT)⁶¹ and is used increasingly for treating chronic pain⁶⁵. ACT focuses in particular on the concepts of acceptance, and mindfulness. The general understanding of mindfulness meditation or mindfulness interventions is represented by the following: “close your eyes for about a minute and maintain an open awareness of the sensations of breathing at your nostrils. There is no need to do anything special, just continuously observe the sensations of breathing in and breathing out at the nostrils with curiosity and interest”⁶⁶. Mindfulness has been associated with a small effect of improved pain symptoms compared with control treatment for chronic pain in a meta-analysis of 30 randomized controlled trials; however, there was substantial heterogeneity among these studies⁶⁷. Moreover, although there are plenty of papers addressing the effect of mindfulness on chronic LBP, its efficacy on pain-related outcomes has not been conclusive; there is limited evidence that it can improve pain acceptance⁶⁸. Mindfulness intervention may be similar to pain desensitization, as meditation exposes subjects to painful sensations by removing catastrophic thoughts. As a consequence, repeated practice can enhance tolerance for negative emotions⁶⁹. A current neuroimaging study has indicated that specific brain regions, such as the medial prefrontal cortex and posterior cingulate cortex, are involved in the self-referential process during meditation⁷⁰.

(5) Encouragement of self-management

Self-management is considered an important strategy for patients with chronic illness⁶⁹. In terms of chronic pain, a number of pain intervention programs based on this concept have consistently shown improvements in treatment outcomes⁷². Confidence in ability to perform specified activities (or self-efficacy belief) has been correlated with the subsequent performance of those activities in patients with chronic LBP⁷³. A well-established self-management program for chronic pain, called ADAPT program⁷⁴, proposed appropriate “goal setting” and “pacing,” adding to the above strategies, to make the program achievable. In goal setting, patients need to identify what they achieve in their life, and what changes are important to them. The goal should be divided into short- and long-term goals, and they must be realistic, achievable, relevant, and specific (Fig. 2). In addition, when the pain is less, patients are more active, but when the pain is worse, they do less and rest more. The main problem is that they will do less and less. For appropriate pacing, activity should be increased stepwise based on planned targets and not the degree of pain. Simultaneously, other strategies mentioned above help the patient get through and build the confidence to cope with pain.

Discussion

Negative perception to self-behavior could be associated with mortality⁷⁵. It is proposed that physiological pain with organic insult can have negative effects on emotions and

cognitive function, and conversely, a negative emotional state can lead to increased pain through the central pain pathway (e.g., noxious neuronal signal to the anterior cingulate cortex)⁷⁶. Many chronic low back pain have both organic and psychological factors⁷⁷. Therefore, people with chronic pain usually suffer from not only pain but also overlapping problems, such as depression, anxiety, sleep disorders, working with disabilities, drug overuse, and low quality of life⁷⁸⁻⁸⁰. Thus, biopsychosocial treatment, which can be substituted by a multidisciplinary approach, is becoming an essential strategy for treating chronic pain⁸¹. A multidisciplinary approach is commonly a well-organized program that consists of the psychological strategies mentioned above, based on the opinion that none of all approaches to the treatment of chronic pain has a stronger evidence basis for efficacy, cost-effectiveness, and lack of iatrogenic complications than multidisciplinary approach⁸¹.

The aim of the present updated review is to introduce the psychological key concepts to clinical practitioners. Indeed, multidisciplinary approaches have succeeded in yielding improvements to pain-related outcomes in patients with chronic pain in Japan, most of which were LBP⁸²⁻⁸⁵. However, regardless of the essential relationship between psychological factors and chronic LBP⁸⁶, there are few facilities that provide a multidisciplinary approach on chronic pain in Japan.

Several reasons might explain why this issue remains unresolved in Japan. First, the psychologist cannot play a role of clinician in Japanese medical administration and insurance system. Although psychotherapeutic treatment by a psychologist needs the instruction of a psychiatrist, most psychiatrists seldom have an interest to treat patients with chronic LBP, and they prefer pharmacotherapy over psychotherapy. Second, in addition to the non-independence of the psychologist, psychotherapeutic studies as medical intervention have lagged behind those in Western countries. In fact, Ono et al. recently reported that while CBT for depression, anxiety disorder, post-traumatic stress disorder, obsessive-compulsive disorder, and personality disorder has been studied, randomized control studies of psychotherapy are seldom conducted in Japan⁸⁷. Indeed, the present review did not find psychotherapeutic studies for chronic pain. It was only in 2014 when a research group at the Japanese Agency for Medical Research and Development in Japan began to establish evidence for the efficacy of CBT on chronic pain in the country⁸⁸. Third, although most patients with chronic musculoskeletal pain in Japan are initially treated at orthopedic facilities⁸⁹, educational categories for specialists approved by the Japanese Orthopaedic Association consist of basic science, musculoskeletal diseases based on morphological pathologies, rehabilitation, and medical ethics and safety. They do not include pain education, particularly psychological strategies, indicating that standard techniques in the management of chronic pain are poorly shared among orthopedic physicians. On the other hand, we have to consider limitations of the psychotherapeutic approaches. Although CBT and mindfulness are very useful strategies for treating

chronic pain, they should be avoided to prevent form organic insults along with a disease progression when treatable pathophysiologies remain as causes of chronic pain. Therefore, an updated biomedical knowledge is also required in the psychotherapeutic approaches for chronic LBP.

As these strategies can apply to older people with chronic pain^{90,91}, widespread dissemination would be expected for Japan's aging society.

Conflicts of Interest: The authors declare that there are no relevant conflicts of interest.

Author Contributions: All authors have substantially contributed to this review article including concept, collection of references, and preparation of manuscript.

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