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## Evidence informed management of chronic low back pain with cognitive behavioral therapy

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### Editors' preface

The management of chronic low back pain (CLBP) has proven very challenging in North America, as evidenced by its mounting socioeconomic burden. Choosing amongst available non-surgical therapies can be overwhelming for many stakeholders, including patients, health providers, policy makers, and third-party payers. Although all parties share a common goal and wish to use limited healthcare resources to support interventions most likely to result in clinically meaningful improvements, there is often uncertainty about the most appropriate intervention for a particular patient. To help understand and evaluate the various commonly used non-surgical approaches to CLBP, the North American Spine Society has sponsored this supplement to *The Spine Journal*, titled Evidence informed management of chronic low back pain without surgery. Articles in this supplement were contributed by leading spine practitioners and researchers, who were invited to summarize the best available evidence for a particular intervention and encouraged to make this information accessible to non-experts. Each of the articles contains five sections (description, theory, evidence of efficacy, harms, and summary) with common subheadings to facilitate comparison across the 24 different interventions profiled in this supplement, blending narrative and systematic review methodology as deemed appropriate by the authors. It is hoped that articles in this supplement will be informative and aid in decision making for the many stakeholders evaluating non-surgical interventions for CLBP.

### Section 1 - Description

#### Terminology

The major goal of cognitive behavioral therapy (CBT) is to replace maladaptive patient coping skills, cognitions, emotions and behaviors with more adaptive ones. From a biopsychosocial perspective, CBT alone does not address all of the important variables potentially contributing to CLBP (e.g. biological factors) but may improve care for patients with psychological co-morbidities. The addition of even a very brief schedule of CBT to usual care from primary care physicians has been shown to reduce pain and anxiety, though such effects may not last over time (1;2). CBT is often a component of multidisciplinary pain programs and patients sometimes find it difficult to perceive the utility of CBT as the sole treatment for CLBP (3). Use of the term CBT varies widely (4) and may be used to denote self-instructions (e.g. distraction, imagery, motivational self-talk), relaxation and/or biofeedback, development of adaptive coping strategies (e.g. minimizing negative or self-

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defeating thoughts), changing maladaptive beliefs about pain, and goal setting. Patients referred for CBT may be exposed to varying selections of these strategies, specifically tailored to their needs.

## History

CBT is a psychosocial therapeutic method in which behavior change is initiated by the therapist by helping patients to confront and change their irrational thoughts, which are most likely the cause of maladaptive behavior. Pioneered by Aaron Beck, CBT bears some similarities to Albert Ellis' Rational Emotive Behavioral Therapy (REBT) (5). Beck proposed that people often have two levels of thought that occur simultaneously: 1. automatic thoughts, which are generally evaluative; and 2. maladaptive thoughts, which CBT seeks to challenge and reframe.

Many authors trace the origins of CBT to Freud's extensive exploration of the unconscious mind, which resembles the CBT concept of "automatic thoughts," occasional irrational thoughts over which the patient has no control (6;7). Freud focused attention on the patients' past as a cause of their present psychopathology, whereas CBT focuses on resolving maladaptive behavior in the present (6). Additionally, whereas Freud's psychoanalysis often prescribed a lengthy course of treatment, CBT is known as a "quick" therapy and generally lasts fewer than 20 sessions (6). Others who have contributed to the development of CBT include the American psychologists Albert Bandura and Donald Meichenbaum (7), who described pain behavior in terms of the learning theories of operant and classical conditioning (8). For example, conditioned responses to visiting a doctor's office (a place where the patient has experienced pain in the past) may induce tension in patients and increase their pain experience (8). In terms of operant conditioning, "sick" behavior is often rewarded by a patient's family (e.g. patient receives care or attention when in pain), workplace (e.g. patient placed on paid leave or given special considerations), and physician (e.g. patient receives attention during a visit). Each of these may reinforce behavior that keeps patients from managing their pain or improving their function (8).

## General description

Turk and Flor (9) describe CBT as having six distinct phases: 1. assessment, 2. reconceptualization, 3. skills acquisition, 4. skills consolidation and application training, 5. generalization and maintenance, and 6. post-treatment assessment follow-up. The assessment phase involves a conversation with patients and their families, as well as a series of self-reported measures to identify the degree of psychosocial impairment and determine the most appropriate course of action. The reconceptualization phase makes up much of the "cognitive" portion of CBT. A great deal of the psychopathology associated with chronic pain conditions is thought to originate in the automatic thoughts or irrational beliefs that pain patients may have regarding their pain condition, including thoughts such as "I am never going to get better," "I cannot bear this much pain," "I am a failure in life because I am in pain," and other maladaptive cognitions. The reconceptualization phase of CBT seeks to help patients to challenge and question the rationality of such maladaptive thoughts. In the skills acquisition phase, the therapist teaches patients how to deal with obstacles in their day-to-day lives, and how to avoid falling into the pattern of automatic thoughts. In the skills consolidation and application training phase, patients are given homework in an attempt to help them reinforce the skills that they have acquired during the skill acquisition phase, one of the hallmark methods in CBT. In the generalization and maintenance phase, the therapist and patients discuss the future, and how the patients are going to cope once they have left treatment. Finally, patients participate in the post-treatment assessments and follow-up phase in order for the therapist to monitor and evaluate patients' application of CBT skills to their lives.

Gatchel and Robinson (10) have provided a comprehensive overview of CBT for chronic pain management, with a session-by-session guide to a typical CBT intervention for a chronic pain patient. It consists of a short-term, skills-oriented therapy in which each session new skills are taught to: 1. correct negative (distorted) thinking about chronic pain; 2. control emotional reactions to chronic pain; and 3. cope more effectively with chronic pain and other stressors.

### **Practitioner, setting, and availability**

CBT should be administered by licensed mental health professionals such as therapists, psychologists, or psychiatrists. This intervention is usually performed in a private practitioner's office, but may also take place in a specialized outpatient pain or spine clinic. This intervention is widely available throughout the U.S.

### **Reimbursement**

Pertinent CPT codes for CBT include 90804: Individual psychotherapy, insight oriented, behavior modifying and/or supportive, in an office or outpatient facility, approximately 20 to 30 minutes face-to-face with the patient; 90805: Individual psychotherapy, insight oriented, behavior modifying and/or supportive, in an office or outpatient facility, approximately 20 to 30 minutes face-to-face with the patient; with medical evaluation and management services; additional codes are available for longer sessions. Traditional psychotherapeutic approaches (e.g. psychoanalysis) have tended to be costly due to the length and number of visits required. One of the benefits of CBT is that it is meant to be performed in a limited number of sessions, after which patients are expected to self-regulate using skills learned during the course of therapy. This is especially useful for patients with chronic conditions such as CLBP, whose insurers will often pay for a maximum number of sessions or dollar expenditure per policy-year. CBT sessions typically cost \$150-200 per hour, depending on the location and qualifications of the provider. CBT is usually covered by insurers for mental health conditions, but may require documentation when requested for CLBP.

## **Section 2 – Theory**

### **Mechanism of action**

It is important to note that CBT does not directly address the physiological component of pain in CLBP. However, the requisite reframing of maladaptive thoughts and coping strategies can lead to a decrease in distress, which may, in turn, reduce the pain experience to some degree (8). Again, it should be noted that CBT interventions proceed from the view that an individual's interpretation, evaluation, and beliefs about his or her health condition and coping repertoire, with respect to pain and disability, will affect the degree of emotional and physical disability associated with the pain condition (11). The general CBT procedure described earlier by Turk and Flor (9) is used for most psychopathologies encountered. However, there are distinctions in the application of this technique that are specific to the patient's diagnosis. Therefore, when discussing the mechanism of action for CBT one needs to take into account some of the more prevalent psychosocial diagnoses seen in patients with CLBP.

For example, patients with CLBP may experience anxiety associated with activities that may cause them to experience or exacerbate their pain. As described in the "medical-symptom stress cycle," such anxiety can lead to behavioral changes that may serve to exacerbate the pain that the patient is experiencing (12) In order to treat such anxiety, the therapist can use a variety of techniques, including biofeedback and relaxation training. The goal of these

techniques is to reduce the anxiety that is associated with the pain experience, and help the patient to ease their tension, thereby decreasing some of the pain symptoms experienced.

In terms of depression, patients with CLBP may have negative cognitions about the present, the future, and the world around them. They may believe that there is nothing that they can currently do to improve the situation in which they find themselves with regard to pain. The patient may also hold the false cognition that the pain will never go away or will never be palliated. Finally, patients may believe that others do not understand their condition. Therefore, when treating depression in CLBP patients, the therapist must actively challenge these negative cognitions and help patients to reframe their present and future situations, as well as their environment.

### **Diagnostic testing required**

Patients should receive a thorough history examination to rule out serious pathology that may be responsible for their CLBP.

### **Indications and contraindications**

There may be different therapeutic foci when CBT is used for CLBP. While most patients with CLBP can be diagnosed with Pain Disorder, it has also been found that CLBP patients have a significantly higher prevalence of psychiatric disorders than the general population (13). Indeed, spine clinicians must often deal with the comorbidity of psychiatric sequelae of CLBP. In order to treat CLBP patients using CBT, it is often necessary to treat comorbid psychiatric disorders, such as anxiety, mood disorders, or pain disorder. Development of CLBP may lead to subsequent psychiatric disorders. For example, persons suffering from chronic pain disorder may also develop alcohol and drug abuse or dependence, whether prescribed or self-medicated (14). Additionally, withdrawal from regular activities such as work, school, and leisure pursuits, may lead to depression or other affective disorders and has been shown to be substantially higher in those with chronic pain (13;14). Patients suffering from CLBP are also known to suffer from pain-related anxiety (15). The ideal CLBP patient for CBT is one with average intelligence, who is motivated to learn coping skills to help manage his or her pain, is compliant with the treatment protocol, and willing to complete “homework” exercises between sessions. Patients with major cognitive deficit due to brain trauma or organic pathophysiology would not likely be good candidates for CBT, which requires basic cognitive-processing skills.

## **Section 3 – Evidence of efficacy**

### **Review methods**

Searches of the CBT and CLBP literature during the past decade were conducted for this purpose, using Medline, Psychlit, and The Cochrane Database of Systematic Reviews. Studies reporting treatment outcome data for variables such as self-reported pain and disability, function, health care utilization and cost, medication use, insurance claims and work factors were evaluated. When available, conventional intervention treatments, such as surgery, were used as the benchmark against which the efficacy of CBT were evaluated.

### **Systematic reviews**

In an earlier invited review, Gatchel and Bruga (16) concluded that there is now convincing evidence-based data demonstrating the effectiveness and cost-effectiveness of multidisciplinary/interdisciplinary pain management programs for occupational CLBP. Indeed, van Tulder, Koes and Bombardier(17) found “strong evidence” for multidisciplinary treatment approaches to CLBP using the Cochrane Collaboration’s high methodology and analysis standards. Such programs are based on the biopsychosocial approach to chronic

pain (18-20), which views chronic pain conditions – including CLBP - as complex illnesses requiring consideration of potentially complex interactions between biological and psychosocial variables. As such, it follows from this perspective that appropriate treatment requires a comprehensive approach designed to address all such factors that cause, mediate, and perpetuate chronic pain and disability.

In a very influential early study, Morley, Eccleston and Williams(21) reported the results of their systematic review and meta-analysis of the existing randomized controlled trials (RCTs) of the efficacy of CBT, as well as behavioral therapy, for chronic pain in general. Their findings concluded that such treatment is effective for a variety of chronic pain conditions in producing improvement in the following important areas: 1. pain experience; 2. pain behavior and activity level; 3. cognitive coping and appraisal; and 4. social functioning. Subsequently, McCracken and Turk (22) reported numerous controlled clinical trials of CBT and behavioral treatment for chronic pain in general, alone or more commonly in multidisciplinary intervention contexts, that indicated these treatments to be efficacious. Results of many published studies in the scientific literature showed that, overall, CBT and behavioral treatments for chronic pain reduced patients' pain, distress and pain behavior, as well as improved daily functioning. More recently, in the lead article of a special topic series on CBT intervention for chronic pain, Vlaeyen and Morley (23) concluded that:

“...cognitive-behavioral treatment interventions for chronic pain have expanded considerably. It is now well established that these interventions are effective in reducing the enormous suffering that patients with chronic pain have to bear. In addition, these interventions have potential economic benefits in that they appear to be cost-effective as well”.

### **Randomized controlled trials**

Numerous well-conducted studies have demonstrated the therapeutic efficacy of CBT techniques, which are a key component in most multidisciplinary/interdisciplinary pain management programs. For example, a study by Brox et al. (24) was an exceptional RCT that compared the relative efficacy of lumbar spinal fusion versus CBT (which also included exercise) for patients who had LBP and documented underlying pathophysiology. A total of 64 participants were randomized into one of these two treatments. At the 1-year follow-up, the “difference between the groups given lumbar instrumental fusion and cognitive intervention and exercise was neither clinically important nor significant”. Both groups displayed significant clinical improvement on a wide range of measures. These findings were similar to those of Fairbank et al. (25) who reported outcomes at 2 years. Even more recently, Brox and colleagues(26) conducted an RCT demonstrating the effectiveness of their CBT intervention with lumbar instrumental fusion in patients with CLBP and who also had a previous surgery for disc herniation. Again, no differences in treatment efficacy were found.

### **Section 4 – harms**

The side effects and adverse events related to this intervention are unknown.

### **Section 5 – summary**

To date, the literature indicates that CBT is an effective component in the overall treatment of CLBP. As noted earlier, the biopsychosocial approach to chronic pain management has moved away from the outdated view that monotherapy is the best approach to achieve overall therapeutic improvement. Multiple factors - biological, psychological and social - must be simultaneously addressed and CBT serves an effective role in dealing with the

psychosocial component of CLBP. However, it needs to be combined with other therapeutic components, such as physical therapy to deal with physical deconditioning issues.

Currently, though, there are no studies directly addressing what combination of components for what type of chronic pain syndrome provide the best therapeutic outcomes. This is a challenge for future clinical research. For example, a recent study by Molloy and colleagues(27) evaluated whether a combination of CBT and a spinal implantable device was effective in the treatment of a cohort of chronic pain patients (75% of whom had CLBP). Results demonstrated that this combined approach produced significant improvements in disability, affective distress, self-efficacy and catastrophizing at long-term follow-up. Previously, this cohort of patients showed suboptimal response to either of these treatment components when administered alone. Although there were some methodological issues associated with the above study, it does illustrate the growing perceived need to conduct “component-type” analyses of comprehensive pain management programs in order to dissect the relative contributions of the various components. This will further advance the heuristic value of a biopsychosocial approach to chronic pain management.

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## References

- (1). Moore JE, Von KM, Cherkin D, Saunders K, Lorig K. A randomized trial of a cognitive-behavioral program for enhancing back pain self care in a primary care setting. *Pain*. Nov; 2000 88(2):145–53. [PubMed: 11050369]
- (2). Strong J. Incorporating Cognitive-Behavioral Therapy with Occupational Therapy: A Comparative Study with Patients with Low Back Pain. *Journal of Occupational Rehabilitation*. 1998; 8(1):61–71.
- (3). Jensen IB, Bergstrom G, Ljungquist T, Bodin L, Nygren AL. A randomized controlled component analysis of a behavioral medicine rehabilitation program for chronic spinal pain: are the effects dependent on gender? *Pain*. Mar; 2001 91(1-2):65–78. [PubMed: 11240079]
- (4). Gatchel RJ, Okifuji A. Evidence-based scientific data documenting the treatment and cost-effectiveness of comprehensive pain programs for chronic nonmalignant pain. *J Pain*. Nov; 2006 7(11):779–93. [PubMed: 17074616]
- (5). Beck JS. In Session with Judith S Beck, PhD: Cognitive-Behavioral Therapy. *Primary Psychiatry*. 2006; 13:31–4.
- (6). Javel AF. The Freudian Antecedents of Cognitive-Behavioral Therapy. *Journal of Psychotherapy Integration*. 1999; 9(4):397–407.
- (7). Dowd ET. Cognition and the cognitive revolution in psychotherapy: promises and advances. *J Clin Psychol*. Apr; 2004 60(4):415–28. [PubMed: 1502271]
- (8). Turk DC. Cognitive-behavioral approach to the treatment of chronic pain patients. *Reg Anesth Pain Med*. Nov; 2003 28(6):573–9. [PubMed: 14634950]
- (9). Turk, DC.; Flor, H. The cognitive-behavioral approach to pain management. In: McMahon, SB.; Koltzenburg, M., editors. *Wall and Melzack’s Textbook of Pain*. 5th ed.. Elsevier Churchill Livingstone; London: 2006.
- (10). Gatchel, RJ.; Robinson, RC. Pain management. In: O’Donohue, W.; Fisher, JE.; Hayes, SC., editors. *Cognitive Behavior Therapy: Applying Empirically Supported Techniques in Your Practice*. John Wiley & Sons; New York: 2003.
- (11). Sullivan MJ, Feuerstein M, Gatchel R, Linton SJ, Pransky G. Integrating psychosocial and behavioral interventions to achieve optimal rehabilitation outcomes. *J Occup Rehabil*. Dec; 2005 15(4):475–89. [PubMed: 16254750]

- (12). Gatchel, RJ.; Oordt, MS. *Clinical Health Psychology and Primary Care: Practical Advice and Clinical Guidance for Successful Collaboration*. American Psychological Association; 2003.
- (13). Dersh J, Gatchel RJ, Mayer T, Polatin P, Temple OR. Prevalence of psychiatric disorders in patients with chronic disabling occupational spinal disorders. *Spine*. May 1; 2006 31(10):1156–62. [PubMed: 16648753]
- (14). DSM, IV. *Diagnostic and Statistical Manual of Mental Disorders*. American Psychiatric Association; Washington DC: 1994. p. 527-8.
- (15). Vowles KE, Zvolensky MJ, Gross RT, Sperry JA. Pain-related anxiety in the prediction of chronic low-back pain distress. *J Behav Med*. Feb; 2004 27(1):77–89. [PubMed: 15065477]
- (16). Gatchel RJ, Bruga D. Multidisciplinary Intervention for Injured Workers with Chronic Low Back Pain. *SpineLine*. 2005; 6(5):8–13.
- (17). van Tulder M, Koes B, Bombardier C. Low back pain. *Best Pract Res Clin Rheumatol*. 2002; 16(5):761–75. [PubMed: 12473272]
- (18). Gatchel RJ. Comorbidity of chronic pain and mental health disorders: the biopsychosocial perspective. *Am Psychol*. Nov; 2004 59(8):795–805. [PubMed: 15554853]
- (19). Gatchel, RJ. *Clinical Essentials of Pain Management*. American Psychological Association; 2005.
- (20). Turk, DC.; Monarch, ES. Biopsychosocial perspective on chronic pain. In: Turk, DC.; Gatchel, RJ., editors. *Psychological Approaches to Pain Management: A Practitioner's Handbook*. 2nd ed.. Guilford; New York: 2002.
- (21). Morley S, Eccleston C, Williams A. Systematic review and meta-analysis of randomized controlled trials of cognitive behaviour therapy and behaviour therapy for chronic pain in adults, excluding headache. *Pain*. Mar; 1999 80(1-2):1–13. [PubMed: 10204712]
- (22). McCracken LM, Turk DC. Behavioral and cognitive-behavioral treatment for chronic pain: outcome, predictors of outcome, and treatment process. *Spine*. Nov 15; 2002 27(22):2564–73. [PubMed: 12435995]
- (23). Vlaeyen JW, Morley S. Cognitive-behavioral treatments for chronic pain: what works for whom? *Clin J Pain*. Jan; 2005 21(1):1–8. [PubMed: 15599126]
- (24). Brox JI, Sorensen R, Friis A, Nygaard O, Indahl A, Keller A, et al. Randomized clinical trial of lumbar instrumented fusion and cognitive intervention and exercises in patients with chronic low back pain and disc degeneration. *Spine*. Sep 1; 2003 28(17):1913–21. [PubMed: 12973134]
- (25). Fairbank J, Frost H, Wilson-MacDonald J, Yu LM, Barker K, Collins R. Randomised controlled trial to compare surgical stabilisation of the lumbar spine with an intensive rehabilitation programme for patients with chronic low back pain: the MRC spine stabilisation trial. *BMJ*. May 28.2005 330(7502):1233. [PubMed: 15911537]
- (26). Brox JI, Reikeras O, Nygaard O, Sorensen R, Indahl A, Holm I, et al. Lumbar instrumented fusion compared with cognitive intervention and exercises in patients with chronic back pain after previous surgery for disc herniation: a prospective randomized controlled study. *Pain*. May; 2006 122(1-2):145–55. [PubMed: 16545523]
- (27). Molloy AR, Nicholas MK, Asghari A, Beeston LR, Dehghani M, Cousins MJ, et al. Does a combination of intensive cognitive-behavioral pain management and a spinal implantable device confer any advantage? A preliminary examination. *Pain Pract*. Jun; 2006 6(2):96–103. [PubMed: 17309716]