

## Pain and Psychotherapy, in the Light of Evidence of Psychological Treatment Methods of Chronic Pain Based on Evidence

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### Abstract

**Objective:** Several types of psychotherapies have been developed for patients suffering from chronic pain. In general it is problematic for all therapies to determine whether they are effective or not. The aim of this review is to reveal the different types of psychological methods and researches conducted on their effectiveness.

**Methods:** Descriptive review based on selective literature search in Medline, PubMed, Science Direct and The Cochrane Database of Systematic Reviews from June of 2013-February of 2014.

**Results:** In case of chronic pain there are psychological treatment methods that have been properly proven to be effective (in compliance with the 2013/14 EBM criteria) such as psycho-education, supportive therapy, behavior therapy, cognitive behavior therapy, acceptance and commitment therapy, biofeedback and relaxation therapy, hypnotherapy, guided imagery, while dynamic oriented therapies, art therapy and family therapy has not been investigated or the results do not properly support effectiveness in pain management. Multidisciplinary treatment approaches including psychological treatments have been verified as an effective and cost-effective treatment approach for chronic pain patients who have failed to respond initial treatment or suffer from psychological problems.

**Conclusions:** Psychotherapies have been proved to be effective and important component of chronic pain treatment.

**Keywords:** Pain; Psychotherapy; Effectiveness

### Introduction

It has been made clear that pain has great disadvantages at the same time for those suffering from it, the patients' family members and for the society, as well [1,2]. Despite its significant effect, chronic pain is not a simple, well defined and understood medical problem. Although the body of growing publications of researches provides more and more information about the phenomenon, available evidence and clinical experience does not seem to be enough to eliminate or adequately control pain in many cases. While in the case of many disorders, the advance of clinical science means a huge development in the treatment of the disease, in many case of chronic pain physical testing and imaging methods do not predict reliably the patient's symptoms and functions and medical and surgical interventions fails to relieve pain [2].

Thanks to the investigations of the social and psychological components of pain, the relevance of psychotherapy in chronic pain management is not questioned any more [2]. The link between pain and psychological features is reciprocal: not only chronic pain has several harmful effects on the patient's intrapersonal and interpersonal life [3], but psychological factors also play a significant role in pain experience itself. As the widely accepted definition of pain shows, pain consists of not merely of nociception, but also of cognitional, behavioral, emotional and social aspects [4]. The consequences of pain

disorder can range from a potential loss of employment caused by physical limitations, associated reduction of income, increased stress, emotional and social problems, anxiety, depression and issues relating to medical adherence. Thus, in order to successfully adapt to live with a chronic condition, patient and their family must adopt permanent behavioral, social and emotional change [5]. Cognitive, behavioral, emotional and social aspects of pain cannot be modified by biological therapies. Psychological interventions are needed to cope with these challenges [6].

Although it is generally problematic for all therapies to determine whether they are effective or not, in case of pain disorders determination of success criteria is a crucial question. The genuine sign of effectiveness could be the reduction of medication needed, return to work, patient's satisfaction, etc. The organization called Initiative of Methods, Measurement and Pain Assessment in Clinical Trials (IMMPACT) developed an integrated method and unified evaluation system for the results of different methods used for clinical pain assessment [7,8]. Four core outcome domains are determined: pain intensity (on a 0 to 10 numerical rating scale); physical functioning, (Multidimensional Pain Inventory, Brief Pain Inventory); emotional functioning, (Beck Depression Inventory, Profile of Mood States); and overall improvement (Patient Global Impression of Change). Out of four domains two or more different methods are recommended to be used to evaluate the clinical trial outcomes in case of chronic pain [7,8].

## Psychotherapeutic approaches in pain management

Psychological management of pain includes a series of therapeutic techniques and methods. A classification of psychological techniques made by Kreitler and Kreitler [9] makes differences between therapies, according to which component of pain is in the focus. Treatments that focused on the sensory component mainly target to attain a change in the sensation of pain by modifying its emotional and cognitive meaning. There are treatments focusing on effects that alleviate pain, but they seem to have limited effect on pain improvement. While therapies focusing on the cognitive component, attempt to make changes in the patient's attitudes towards pain, while those focusing on the behavioral component are designed to use learning processes.

Sensory component	guided imagery, hypnosis, auto-suggestion, relaxation, biofeedback, distraction/displacement of attention, music therapy, meditation
Affective component	supportive therapy, meaning-based control of negative emotion, dynamic psychotherapy, art therapy
Cognitive component	psycho-education, didactic information-based techniques, cognitive attitude-based therapy, cognitive coping therapy
Behavioral component	operant conditioning, environmental therapy, behavioral therapy

**Table 1:** Psychotherapies according to which element of pain they focus on Pain Reduction (source: Kreitler & Kreitler, 2007)

## Methods

Selective literature searches were conducted on the effectiveness of different psychological treatment methods of chronic pain using Medline, PubMed, Science Direct and The Cochrane Database of Systematic Reviews.

## Results

Firstly, different psychological treatments and their effectiveness and outcome is reviewed, secondly the multidisciplinary approach is discussed from June of 2013– February of 2014.

### Psycho-Education

Pain control is attained by providing information about the pain management. Educational sessions are usually in groups in the form of lectures or discussion meetings. Sometimes spouses and the family are included as well [9].

A systematic review and meta-analysis of nineteen RCTs on the effectiveness of psycho-education showed that self-management programs have small to moderate effects in improving pain and disability at the long-term level [10]. An RCT evaluated the impact of a low-cost six-week angina psycho-education program (The Chronic Angina Self-Management Program, CASMP) among cardiac pain patient. Measured variables were health-related quality of life (Medical Outcomes Study 36-Item Short Form, Seattle Angina Questionnaire), self-efficacy (assessed by Self-Efficacy Scale), and resourcefulness (Self-Control Schedule) to self-manage anginal pain. Participants (n=117) were randomized to the CASMP or three-month wait-list usual care. Measures were taken at baseline and three months. Analysis of variance of change scores indicates that the CASMP was effective for improving physical functioning, general health, anginal pain

symptoms, and self-efficacy to manage pain at three months and provide a basis for long-term evaluation of the program [11].

### Biofeedback

Biofeedback is a technique in which pain control is attained by acquiring voluntary control over physiological responses related to pain. Patients are connected to electrical sensors that give systematic and relatively immediate feedback about physiological responses that are normally subliminal (e.g. muscle tension, skin temperature, heart rate, blood flow). Electrodes are attached to certain organs (e.g. to tensed muscle groups), and the feedback is given through auditory or visual stimulus. Patients are taught to use a number of strategies for controlling tension (e.g. relaxation, imaginary techniques, deep breathing) and asked to practice these techniques with the help of the biofeedback equipment to reduce pain through muscle-relaxation [9].

Researches on the efficacy of biofeedback were reviewed in a meta-analysis, where 55 RCT-s were included. The result shows medium effect size, and this effect shows to be stable over time (17 month later). Also, besides migraine attacks and perceived self-efficacy improved significantly, biofeedback proved to be more effective than control conditions [12].

### Relaxation Therapy

Relaxation is a technique in which patients learn to relax major muscles intentionally. There are several types of relaxation. In progressive muscle relaxation people are asked to tense and then relax specific muscle groups in a given order. Another type is autogenic training that involves a daily practice of 15 minute session in which people are encouraged to repeat a set of visualization to induce muscle relaxation [9].

The National Institute of Health Consensus Conference declared that relaxation is effective in the treatment of a variety of pain conditions (1995). Although pain level is proven to be linked to muscle tension, thus relaxation techniques lower frequency of pain, research data are controversial on the effectiveness of relaxation therapy [13-16]. Nevertheless, in an updated review [17] relaxation showed large and sustainable improvement on pain for children with headache, musculoskeletal and recurrent abdominal pain. Cost-effectiveness has been verified in a study in the 90s [18].

### Supportive Therapy

Improving pain is based on legitimizing it, expressing empathy for suffering, encouraging patient to express his or her feelings. In the focus of the treatment is the trusting and holding relationship between therapist and patients, providing the patient with acceptance, comfort and reassurance without any direct intervention [9].

Although social support is essential for healing and some studies shows beneficial effects in improving pain, as well [19], a directive method – e.g. cognitive therapy – yields better treatment outcome and patient satisfaction, than the nondirective supportive therapy [20].

### Behavior Therapy (BT)

The main emphasis is placed on reinforcing adaptive behavioral strategies (e.g. active problem solving, exercising, return to work, engaging in social activities), and avoiding non-adaptive behavioral strategies (e.g. excessive use of drugs, overcautious movements,

gradual complaining). The theory of behavioral therapy emphasizes the reinforcing roll of the environment (e.g. family), since subjective ratings of pain could be increased or decreased based on external reward or punishment [21]. To enhance adequate coping main techniques are writing a diary, setting reachable goals, giving reinforcements (rewards and punishments) [9].

Behavioral therapy seems to be effective in different studies [22]. In a meta-analysis Henschke et al. [23] included 30 randomized trials (3438 participants) in a review updating a previous version [24]. Researchers found moderate quality evidence for operant therapy to be more effective than the waiting list for short term pain improvement (SMD -0.43; 95%CI -0.75 to -0.11). There is little or no difference between operant, cognitive, or combined behavioral therapy for short and intermediate-term pain relief.

### **Cognitive Therapy (CT)**

Pain control is improved by changing attitudes of patients toward their pain. The underlying assumption is that cognitions and beliefs have a great impact on the experience of pain. The patients' beliefs and long-term rehabilitation have strong correlation [25]. There are cognitive therapies specialized in pain management. One of them is fear-avoidance therapy focusing to reduce fear of movement and physical activity. Another type of cognitive-oriented pain management is acceptance- and commitment therapy (ACT) that includes techniques using an altered state of consciousness (e.g. mindfulness therapy). ACT targets acceptance of aversive experience such as pain instead of attempt to change or avoid it [9].

The widest body of literature on effectiveness of psychotherapy is on cognitive oriented therapies verifying its effectiveness. First quantitative review appeared in 1988 [26] the second in 1996 [27] both showing improvement in the pain reports, subjectively reported pain behavior and disability. First meta-analysis was conducted in 1999 [24] including 25 controlled trials (n=1672 patients). According to the results cognitive therapy is effective in improving the pain experience, activity, pain behavior, cognitive reinforcement and social relationships. Henschke et al. ([23] updated Morley's meta-analysis including 30 randomised trials (3438 participants) and got similar but more detailed results: CBT has moderate effect on pain improvement in short- and medium-term. Further reviews concluded similar effects [28-30]. Cost-effectiveness of cognitive therapy is proven as well [31,32]. One of the most promising RCT-s compared lumbar instrumented fusion with cognitive intervention and exercises in patients with chronic back pain after previous surgery for disc herniation (n=60) [33]. There was no significant difference between surgical and CBT groups: 50% success rate in the fusion group and 48% success rate in the CBT group. Cognitive oriented therapies specialized in chronic pain management seem to be effective as well, such as acceptance and commitment therapy [34] and fear-avoidance therapy [35-38].

### **Psychodynamic Oriented Therapies**

Aim of psychodynamic psychotherapy is to enable the patient to develop insight into his/her unconscious processes (one's motivation, to resolve conflicts, overcome earlier traumas, and experience catharsis by expressing emotions), because the liberation from emotional suffering is supposed to contribute to the liberation from pain, or at least from its psychological components. There are several therapeutic approaches - gestalt, Freudian, analytical, Adlerian, existential,

psychodramatic-working with different means in attaining pain control [9].

There are only a few controlled studies measuring the effectiveness of psychodynamic psychotherapy in chronic pain patients and their results do not support the pain improving effect of these methods. One of them [39] revealed significant improvement only on the activity level, in another one [40] significant and substantial change was detected on the level of somatization, depression, anxiety, denial, assertiveness, social withdrawal, and increased effect of consciousness. Results remained stable at the 1-year follow-up. There is one systematic review on RCTs and CTs including 6 trials. Pain reduction was revealed in 5 studies, decrease in disability in 3 studies, but emotional distress did not change [41]. Authors concluded that psychodynamic therapy is indicated in the case of somatoform pain disorder and psychic co-morbidity.

### **Guided Imagery**

Pain control is improved with the help of imagery produced by the patient and shaped to a certain extent by the therapist. The most potent images for pain control is endowing pain with metaphoric forms and moving it away from the body, or transforming the pain sensation or changing the meaning of the pain e.g. necessary for healing or beneficial [9].

Guided imagery seems to be effective in pain reduction, but further investigation is needed by well-designed researches. In a controlled guided study imagery has improved pain frequency, pain severity, quality of life, and mental health significantly better than in the case of control groups. It was concluded that guided imagery is an effective adjuvant treatment for tension-type headache [42]. In a review where fifteen randomized clinical trials were involved guided imagery led to a significant reduction of non-musculoskeletal pain in eleven studies [43].

### **Hypnotherapy**

According to Kihlstrom's definition hypnosis is "a social interaction in which one person, designated as the subject, responds to suggestions offered by another person, designated the hypnotist, for experiences involving alterations in perception, memory, and voluntary action" [44]. A hypnotic session usually has six phases: patient selection and preparation, induction (encouraging patient to focus his or her attention), deepening, therapeutic suggestion (altering patient's experience) and termination (encouraging patient to defocus his or her attention) [9]. Aiming at pain reduction, suggestions consists of changing sensations from pain to something else; increases in comfort; alteration of focus of attention away from pain; and increased ability to ignore pain [45].

The evidence supporting the effectiveness of hypnosis in alleviating chronic pain seems to be strong. Trials with high methodological quality have already appeared since 1975 showing significant pain improvement comparing to control groups [46,47]. In a meaningful review of literature on headache Hammond [48] gathered RCTs and concluded that the efficacy of hypnosis with headaches has been demonstrated to be statistically superior or equivalent to commonly used medication treatments. Besides, in another study, hypnosis proved to be cost-effective, as well [49].

## Art Therapy

In art therapy learning to express one's self happens through the focus of the media of the arts, such as visual arts, dance or movement, writing or telling of stories, writing poetry, photography, acting, film making, singing and playing a musical instrument. In art therapy prior learning or expertise is not necessary [9]. There is not enough research data investigating the effectiveness of art therapy in chronic pain.

## Family Therapy

In family therapy pain control is attained by changing the family members' beliefs and behaviors contributing to the patient's pain experience. According to the family therapy theory, family members contribute to the pain exacerbation and maintenance through rewards (e.g. love, support, comforting) and punishment (e.g., frustration, anger, blame) they provide to the patients. Accordingly, one of the approaches focuses on altering maladaptive behaviors among family members to adaptive ones. Another version of family therapy tries to detect and change dysfunctional beliefs of the family members and encourage them to help to change the patient's beliefs, as well [9].

Family therapy does not seem to be effective directly in pain management, however, it increases marital satisfaction that may interfere with the pain experience. Although uncontrolled trials report success in pain management [50-52], RCTs show that family therapy is capable of making changes in the satisfaction of partnership [53], but not in pain improvement [54]. Spouse involvement did not facilitate treatment outcome [55]. Kerns and Otis [5] concluded in their review that it is failed to prove that including family members in pain treatment would improve outcome.

## Multidisciplinary Approaches

Multidisciplinary therapy attains pain reduction by several different types of treatment: medical treatment, manual therapy, psychotherapy. Its aim is to maximize pain improvement, quality of life and psychological well-being. In a multidisciplinary team there are specialists such as anaesthesiologist, neurologist, rheumatologist, orthopedics, neurosurgeon, clinical psychologist, psychiatrist, nurse, rehabilitation therapist, physiotherapist and physical therapist. Those chronic pain patients are referred to multidisciplinary pain center, who have failed to respond initial therapy or have uncertain diagnosis despite detailed medical evaluation. People with significant level of psychological problem have to be referred to multidisciplinary treatment as early as possible [32,56].

The effectiveness of multidisciplinary approach has been investigated in several researches. There has been strong evidence that it improves function and moderate evidence that it improves pain [56]. A meta-analysis were conducted in 2006 concluded that multidisciplinary pain programs are the most efficacious and cost-effective treatment for people with chronic pain [32].

## How does psychotherapy work?

To summarize the results of researches psychotherapy can be viewed as an adequate treatment for a physical disease such as chronic pain [56-60] having no harmful side effects and a verified cost-effectiveness [32]. However reluctance toward psychotherapy can be observed among both patients and doctors, maybe because of their lack of our knowledge about the nature of pain. The neural basis of how psychotherapy works has only started to be investigated in the

recent decades. Emerging evidence can be found proving that psychological treatments have similar underlying neurobiological effects as biological therapies.

Changes occur as a result of psychotherapy involving the neurobiological system starting at a molecular level, the fields of gene expression [61,62]. But it seems that neuroplasticity, explicit and implicit memory systems, early attachment processes, as well as the biological underpinnings of mental disorders has considerably influence on changes through psychotherapy emphasizing the importance of therapeutic relationship. Recent neuroimaging studies have also displayed that psychotherapy significantly modifies functions and structures of the brain [64].

## Discussion

Although chronic pain is an endemic, affecting 11-60% of the population [64,65], its management has proven to be very challenging and patient care is not yet resolved all over the world. The expanding knowledge on the nature of pain and understanding of its etiology has emphasized the role of psychology in pain management. The patient's psychological statement and the pain experience have a reciprocal connection: not only pain has severe impact on patient's intrapersonal and interpersonal life, but the patient's personality also affects the pain experience. There are several types of psychotherapies specialized in pain management aiming at the treatment of psychological components of pain. Some of them have already proven to be effective (cognitive-behavioral therapy, hypnosis), but in the case of most psychotherapeutic methods (family therapy, dynamic oriented therapy) higher quality research is needed to clarify the level of efficacy. While huge efforts have been made to understand the effect of biological treatment (e.g. on brain's functions and structure), the research evidence on how psychotherapy affects biological systems (e.g. brain functions) leading the desired therapeutic change is limited. Understanding the neurobiological basis of changes psychotherapy induces promising researches in which it is explored that psychotherapy has the same effects as pharmacotherapy: it has spectacular impact directly on the brain.

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