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Chapter 4

COGNITIVE BEHAVIORAL THERAPY IN PAIN MANAGEMENT OF ADULT CHRONIC NONMALIGNANT PAIN PATIENTS*

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ABSTRACT

The origin, course and subsequent maintenance of pain is influenced by psychosocial factors. For this reason, psychotherapy is also used in pain management and the use of cognitive behavioral therapy (CBT) is dominant. This chapter describes the history of CBT and its three basic approaches: behavioral, cognitive and cognitive-behavioral. The indication to CBT and the most frequent problems in treatment are

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defined. Basic CBT techniques in chronic pain management, namely cognitive restructuring and the practice of skills for pain and stress management (education, adaptive positive self-instruction, relaxation and imagination, graded activity, exposition, structured problem solving and relapse coping) are specified. Particular fields of chronic pain which represent the goal of the multidisciplinary program of pain management including CBT are examined. The authors structure the basic assumptions of a successful program: direct and indirect positive reinforcement of pain behavior, positive reinforcement of required behavior, improvement of physical condition, cognitive reframing, education, training in CBT in pain management and conforming to CBT principles. The chapter summarizes the efficiency of CBT in chronic non-malignant pain management in adult patients, describes problems in its monitoring and suggests some innovations increasing its use.

INTRODUCTION

Pain is a signal of threat to the body, or possibly life, and therefore represents a signal of the highest priority. At the time of its onset, pain interferes with central processes and influences attentional focus, constricts and reorganises mental and congnitive processes as well as behavior to the perceived threat and alters social communication processes in pain sufferers (Eccleston and Crombez, 1999). The feeling of pain and the cognitive appreciation of what pain means thus induce fear and, simultaneously, the processes of intensive mental coping with pain and related problems, so-called coping processes. These mechanisms are adaptive in acute pain, or with adequate cognitive appreciation of pain. If, however, the fear of pain, constricted attentional focus and catastrophic thinking persist to the same or slightly diminished degree in chronic pain, they are usually maladaptive. They deform and are more or less autonomous, almost independent of the current pathophysiological status. If these processes persist after the healing of the pain process, they are unambiguously pathological. Pain as a signal, however, may also be associated with loss of information, or a completely false signal (phantom pain, somatoform pain) may be concerned.

For basic classification, pain may be divided into malignant and nonmalignant pain, neuropathic and nociceptive pain, and mixed pain (representing most cases of chronic pain). Regarding the time factor, we divide pain into acute, chronic and recurrent. Chronic nonmalignant pain often persists beyond usual healing time, lacking the warning signal function. It is mostly caused by a combination of different factors such as injuries, disease

and medical interventions. The psychologically complicated chronic pain state, however, is characterised by the fact that it often cannot be explained purely based on pathophysiology. A chronic pain patient experiences suffering, which is a cognitive-affective construct. It represents a loss of the sense of meaning, combined with depression. Specifically, it occurs in the third stage of psychological pain processing (Wade et al., 1996). This complex of generalized effects is relatively independent of the actual feeling of pain. The suffering may be a result of somatic, mental or social causes; thus it is a consequence of somatic, psychological or social processes. Chronic pain (duration and intensity) may lead to a more intensive feeling of jeopardy in the patient. This is associated with the anxiety-escape / anger-attack response, or with anxiety / anger / impossibility of escape/attack – i.e. with emotions (Spielberger et al., 2003). Emotions can influence the intensity of pain. This process involves unpleasantness and the neurophysiological aspects of the pain mechanism and analgesia (Price 1999; Price and Harkins 1992). Patients reporting a higher intensity of pain are more likely to experience depression, anxiety and anger than patients describing a lower intensity of pain. It is also often very difficult for a patient with chronic pain to deal with personal, social and relationship problems such as somatic restrictions, changes in life roles (as regards work, family or leisure) and legal problems due to pain. Patients with intensive chronic and persistent pain usually experience profound psychosocial distress as a consequence of long-lasting pain and only a small subjective effect of any treatment administered so far on their quality of life. For this reason, psychotherapy forms part of the multidisciplinary management of chronic nonmalignant pain.

BACKGROUND

In 1879, W. Wundt established the first psychology laboratory in Leipzig. Psychological approaches to pain management do not date back beyond this date. The term “psychogenic pain” was first used in 1904 by O. Binswanger. In 1909, E. Titchener founded a psychology lab in Cornell, USA, and observed that pain had not only sensory, but also emotional components. In 1920, I. P. Pavlov showed that a dog can have a conditioned response to a painful stimulus in a manner that is usually associated with being exposed to food. In 1965, R. Melzack and P. Wall published a paper on the gate theory of pain in which they provided a framework for understanding the relationship between a peripheral noxius stimulus and the experience of pain (Melzack and Wall,

1965). The theory showed that the transmission of pain messages may be modulated by somatic mechanisms as well as by non-specific modulation mechanisms (such as personal characteristics, mood, social impacts, learning, etc.) that can also decrease or increase the intensity of pain. In 1968, R. Melzack and K. Casey described the three basic dimensions of pain: 1. "sensory-discriminative" (intensity, location, quality and duration of the pain), 2. "affective-motivational" (unpleasantness of pain and urge to escape the unpleasantness) and 3. "cognitive-evaluative" (appraisal, cultural values, attentional distraction from pain and hypnotic suggestion) (Melzack and Casey, 1968). Their theory has shown that intensity (the sensory-discriminative dimension) and unpleasantness (the affective-motivational dimension) of pain are not influenced only by the volume and quantity of pain stimuli, but also by cognitive processes (the cognitive-evaluative dimension). Cognitive processes can influence both the sensory (intensity, quality) and affective experience (discomfort), or they primarily modify the affective-motivational dimension. That is why, for example, enthusiasm in a game, or excitement in a war, may block the 1st and 3rd dimension of pain, while suggestion and placebo may modulate the affective-motivational dimension and, at the same time, not influence the sensory-discriminative dimension. In the late 1960s, the three basic dimensions of pain marked an important advancement in therapy: pain can be treated not only by interrupting sensory information, for instance using anaesthetic blockade, or surgically, but also by influencing affective-motivational and cognitive factors.

In the late 1960s and early 1970s, W. E. Fordyce described the concept of pain behavior and the operant approach to treatment. At the beginning of the 1980s, D. C. Turk developed the cognitive-behavioral (CB) model of chronic pain. In the 1990s, based on the work of Turk and Salkovsky, chronic pain therapy began to integrate more and more cognitive therapy. The works by Fordyce and Turk also serve as a basis for Loeser's biopsychosocial model of pain (Loeser and Turk, 2001). Two groups of models are based on the concept of dimensions of pain by Melzack and Casey, the concept of pain behavior, and CBT development: models of gradual stages of change in chronic pain, and models emphasizing feedback processes in the development of psychological changes. Regarding models of gradual stages of change, a four-stage linear causal model was developed: 1. sensory-differentiating stage of pain, characterized by intensity; 2. affective stage 1 - characterized by feelings of unpleasantness and emotional annoyance; 3. affective stage 2, i.e. "suffering", the cognitively mediated stage of pain, leading to generalized changes in affects such as fear, anxiety, frustration, anger or depression; and 4.

apparent behavioral manifestations of pain (Wade and Hart, 2002). Models emphasizing feedback processes assume that if pain and pain evaluation lead to "catastrophizing" (a cognitive construct that involving the choice of unfavourable and threatening information, inducing strong fear, avoidance, and depression), an unfavourable development of the pain condition continues. If the evaluation of pain arouses low fear, it leads to adaptation and recovery (Vlayen et al., 2012). Psychological processes in chronic pain comprise both models of consecutive stages of change in chronic pain as well as models emphasizing feedback processes in the development of psychological changes.

COMPONENTS OF PAIN

Each individual's perception of pain varies in all its domains (i.e. somatic, emotional, cognitive and behavioral). Therefore, besides the sensory aspect, pain also includes emotions, thoughts, behavior and social processes; a bidirectional causal relationship is applicable here. Pain is subjectively expressed by an individual in terms of intensity, quality and suffering (i.e. attitude to pain). In the somatic component of pain, the psychotherapist should focus on the words the patient uses to describe the quality of pain (pulsating, throbbing, stinging, shooting, burning, crampy pain); on the time aspect (how often the pain occurs); what the intensity of the pain is and how long the pain lasts. In order for the psychotherapist to better understand the emotional component of pain, he or she should ask the patient about his or her mood and emotions when experiencing the pain. The patient may feel anxious, frustrated, desperate, furious or depressed. Identification of emotions associated with pain is important, mainly for depression and situational anxiety, their duration and specific reactions to the fear of movement and pain. It may be very difficult for the patient to distinguish emotions from the somatic component of pain and emotional changes are often indicators of important shifts in thinking. Therefore, the therapist should also know what thoughts and basic beliefs are activated in an individual when he or she experiences pain, i.e. the cognitive component of pain. Chronic pain patients tend to have specific opinions and beliefs about pain, including how significantly pain affects their life as well as life of the others. For instance, they are unable to participate in work or daily activities, enter into relations with other people in an adequate way, have problems with their own role in the family and lose their identity. For these reasons they often have negative, unrealistic and catastrophic thoughts. For example, a patient with chronic pain thinks: "Pain has taken my life from me. I

cannot overcome the pain myself in any way. God is punishing me for my sins." Catastrophic thoughts correlate with anxiety and the increased intensity of pain. Chronic pain patients are more vulnerable to catastrophic thoughts than, for example, depressive patients not suffering from pain (Winterowd et al., 2003). It is therefore important also to monitor any coping styles employed, for instance the extent of passivity and negative appraisal, the extent of catastrophic thinking and the ability to solve problems. It is also important for the psychotherapist to know what the patient does and how he or she behaves when suffering from chronic pain, which concerns the behavioral component of pain. Pain behavior represents the overt behavioral processes associated with pain, disability and the overall functioning of an individual. Some individuals may behave in very specific ways. Most of them, if they feel intense and persisting pain, try to avoid the pain: they often lie down and rest more often than normal, seeking relief. The fear of pain is more debilitating than the pain itself and often has a much higher intensity than the pain itself (Raudenska et al., 2013). Other patients may want to manage all the activities that they had before the pain, which leads to increased fatigue, pain and plan failure. Others may, only in order to alleviate the pain, overuse painkillers. This pain behaviour, in the broader sense of the word, requires the attention of not only the psychotherapist, but also of all the medical staff in the therapeutic team as well as other important people around the individual who may reinforce the pain behavior or the intensity of pain and suffering. That is why the therapist focuses on the impact of pain and its treatment on the general physical condition of the patient, changes in social roles and social functioning and behaviour related to health care provision – use of prescribed and over-the-counter drugs, the number of visits to the general practitioner, the number of visits to specialist physicians for a "second opinion", and regular as well as irregular visits to see a doctor at a Pain Management Centre (Morley et al., 1999).

As a patient's experience of pain is individual in all the above mentioned pain components, the therapeutic approach focuses on emotions, thoughts, opinions, beliefs, behavior and other somatic complaints. Therefore, the use of cognitive behavioral therapy (CBT) is dominant worldwide in the treatment of patients with chronic pain, altered mental states, irrational cognitive schemas and pain behavior.

APPROACHES

In the development of CBT in pain treatment, we may distinguish three basic approaches: behavioral (operant), cognitive and cognitive-behavioral. Behavioral approach. In the late 1970s, W. E. Fordyce published psychological methods in pain treatment based on behavioral methods (Fordyce, 1976). They focused on changes in behavior (relaxation, systematic desensitization, training in assertivity and social skills). Fordyce defined behavior as "observable and potentially measurable responses of an organism", thus, "observable movement". He compared behavior to the "dead man test": a dead man could not speak, cry or walk. If an individual's behavior was only observed, it was not sure whether or not he or she was thinking at the same time, whether he or she felt or did not feel sad, or if he or she felt or did not feel restless. For this reason, Fordyce defined speaking as behavior. Fordyce limited behavior to activity observable by others, excluding internal processes such as thinking or imagination. Notwithstanding, Fordyce's work comprised numerous innovations: he promoted pain behavior exposure and elimination of the behavior through ignoring, while reinforcing positive (healthy) behavior by praise/reward. Treatment involved eight weeks of hospitalization based on reduction of activity avoidance, aerobic, fitness and stretching exercises, and occupational therapy. He also described systematic pharmacologic therapy in pain management and integrated family into the treatment. Patients in Fordyce's studies showed an enormous increase in physical activity, a decrease in medication use and pain intensity in the active treatment phase. In the first stage, the studies did not have a control group, but control groups were included in the 1980s. Fordyce gradually oriented pain therapy to an outpatient form in which treatment duration was decreased to four weeks and patients were followed for two years. Not only did behavioral therapy decrease the intensity of pain, but it importantly increased social and work activities and pointed out the social aspects of chronic pain behavior (McCracken, 2005). Fordyce's operant approach emphasized the influence of learning on pain-related behavior, but for instance omitted certain somatic factors such as health status or cognitive factors such as the patient's expectations. In the 1970s, Fordyce and his colleagues drew attention to the possibilities of integrating psychotherapy to chronic pain management to a significant extent.

Cognitive-behavioral approach. In the 1970s and 1980s, cognitive therapy developed too. On the basis of works by Beck, Rush, and Shaw and Emery, D.C. Turk worked out the cognitive-behavioral (CB) model of chronic pain in

the early 1980s (Turk et al., 1993). The aim was to unify useful methods from the behavioral approach and integrate methods from cognitive therapy. In pain management, the work represented a significant deflection from the operant approach represented by Fordyce in the 1970s. The basic assumptions of the cognitive-behavioral approach of Turk and his colleagues were: 1. emotions and behavior are influenced by the way in which the individual constructs his world; 2. therapy should help the patient identify and test reality and correct maladaptive, deformed and distorted belief. This allowed for work with the maladaptive thoughts that influence and maintain maladaptive behavior. Contrary to behavioral therapists who used external manipulation to change behavior, Turk and colleagues used manipulation as an information feedback experiment (behavioral experiment). This provided the patient with the possibility to ask, reappraise, review and gain control over his/her maladaptive cognition and feelings as well as behavior. The behavioral approach focused more on changing the patient's external environment with the aim of a change in behavior, the CB approach focused primarily, but not exclusively, on control and cognitive methods to achieve the desired change in mood and behavior. CBT advanced pain therapy in many ways: it brought focus on thoughts and feelings and their importance in the experience of pain; it helped patients focus on changes in behavior which may be initiated in the therapy through active cooperation and participation in treatment; applied skills to reduce pain and improve psychosocial functioning including fitness; defined attention, thoughts and patterns of behavior as the target for potential change. The patient's response to pain may include observable pain behavior, but also thoughts and images assessing situations associated with pain. These play an important role mainly in the event that the original harm that caused the pain is no longer present, or was not found at all by current diagnostic medical methods. Avoidance behavior may be encouraged by cognition. Anxiety and stress may reinforce the idea that "some damage" causing the pain does exist, which gives rise to cognitive errors, mistakes, negative appraisal and avoidance - the vicious circle remains. The CB model incorporates stress which may increase anxiety as well as pain behavior (Sharp, 2001). In CBT, individual methods are targeted at forms and frequency of thoughts and ideas, consequently leading to other changes in patient behavior. Thus, the changes in dysfunctional attitude are undoubtedly the causal mechanism of the treatment effect (Burns and Spangler, 2001).

In the 1990s, on the basis of the work of Turk and Salkovsky (focusing on the study of anxiety and depression in chronic pain), CB therapy of chronic pain starts to incorporate cognitive therapy to an increasing extent. The

principle resides in the fact that people do not respond directly to stimuli from their surroundings, but to cognitive representations of this environment. The process of learning is based on the model of stimulus-organism-response-consequence. Cognitive processes have an intermediary function between the stimulus and behavior. It is not the stimulus (such as back pain) which induces certain behavior (I lie down, or I am lying down most of the day), but the meaning that the person attributes to the stimulus. The meaning of pain "I must lie down, otherwise it will get even worse and I will have to be operated on" leads to lying down on the bed and actually to pain relief, but gradually also to decreased activity and significant deterioration of the general musculoskeletal and cardiovascular condition. The consequences reinforce or weaken behavior, based on what meaning the person has attributed to the consequences. The key skills that chronic pain patients can learn during cognitive therapy include: identification and attenuation of the negative and unrealistic assessment of pain, of themselves, the world and the future, and the ability to solve problems (this will allow them to make decisions, complete tasks and set realistic life goals). Thanks to the knowledge and use of these skills, patients with chronic pain may experience pain less intensively, feel less emotional anxiety, improve their ability to cope with situations and have better relations with other people, including doctors and medical staff, colleagues, family members and friends. At the beginning of the 21st century, the synonym cognitive therapy starts to be used for CBT (Winterowd et al., 2003), even though, for instance, both the fully cognitive and behavioral approaches are advocated. Isolated use of cognitive or behavioral techniques, however, may limit the treatment of anxiety or depressive disorders that often accompany chronic pain. For example, behavioral treatment of anxiety disorders, including exposure, also produces changes in cognitive variables. Similarly, for example, analysis of CBT in depression shows that cognitive treatment strategies alone do not play an essential role in achieving change in automatic negative thoughts or dysfunctional schemas, and it is therefore advisable to apply behavioral techniques as well.

INDICATION FOR CBT

Patients who are referred for CB pain therapy are often in long-term incapacity for work or are already receiving social benefits, have decreased functional capacity, impaired social roles, experience chronic fatigue and often suffer from sleep disorders. After some time they become socially isolated and

dissatisfied with their role in the family as well as with their competences. The patients rely too much on support provided by the social and health care system, which is intensified by the never-ending search for the second opinions of other doctors, repeated iatrogenic surgical solutions, and thus never-ending pain treatment (Sharpe and Bass, 1992). Perpetual attempts at adapting oneself to pain and its negative consequences often result in a number of emotional problems the most frequent of which are depression and fear associated with pain as well as other phobic responses (fear of social interaction, of leaving a safe environment, fear of blood, illness and death) (Asmundson et al., 1996). Chronic pain, fear and depression also have a negative impact on other cognitive functions: decreased focus of attention, worsened memory and increased failure in cognitive tasks (Estlander, 1996; Schnurr and MacDonald, 1995).

Thus, the individual, in an individual way, is always experiencing problems associated with pain treatment which influence suffering. These may be divided into four areas. Problems occurring in the area of personal problems include changes in understanding oneself and in self-appraisal, role loss, the depersonalization of the individual in the health care system and a continual search for medical care. In the domain of relational and social problems, conveying the subjective experience of pain to others has become the principal problem for the patient. The patient does not know what he or she can expect from the other people. This results in social isolation and renders the making of contacts more difficult. In the third area concerning philosophical and existential problems, the patient often asks him or herself questions such as: "Why me?", "What shall I do now?" and "What is the sense and meaning of life with chronic pain?". In the domain of spiritual problems, the patient, under the influence of chronic pain, reevaluates not only his/her faith, but also the general concept of spirituality. The individual problems of each individual in all the above mentioned areas affect how the patient will respond to treatment, how he or she will comply with treatment, how he or she will follow recommendations and what will the benefit be to his or her sense of life even with suffering and chronic pain.

Modeling the etiology and maintenance factors in the individual types of chronic pain is a challenge for further therapy (Soderlund and Lindberg, 2001). The narrow concept of CBT is therefore formed by behavioral analysis of the patient's problem. Cognitive behavioral therapy may be used as individual or group therapy. Individual CBT is short, structured therapy consisting of up to 5-10 sessions. The therapist is always active and directive in conducting this therapy, seeking the client's active cooperation.

The broad concept of CBT in pain management is represented by holistic programs conducted by a multidisciplinary team. Treatment involves group therapy, combined psychotherapy, pharmacotherapy and physiotherapy and patients are hospitalized in Pain Management Centres for 2-4 weeks, the treatment may also be conducted on an outpatient basis. Without the possibility of an interdisciplinary team, treatment inefficiency increases because patients are looking for a "cure" for their pain (i.e., its removal or alleviation) (Loeser, 1996). This cannot be wondered at. For this reason, treatment is primarily focused on reducing the undesirable impact of chronic pain on life, that is, on improving the quality of life, and not on decreasing or removing the pain. Indications for CBT are: 1. the patient suffers from unmanageable chronic pain, 2. The pain affects the patient's emotional status, or the emotional status worsens the pain intensity, 3. The patient has difficulty coping with pain and treatment (e.g. a problematic relationship between the doctor and the patient, the patient is afraid of being examined or of therapy, he or she exacts it, or refuses it), 4. The patient faces a stressful situation of a psychosocial nature (tense relations with family and friends, physical limitations disabling the patient from performing common tasks and activities independently), has lost his or her job or has serious financial problems. CBT may be contraindicated in chronic pain patients for serious cognitive deficits, lack of interest and motivation, or if the patients are acutely psychotic at the time of treatment initiation. These patients may benefit from behavioral interventions or supportive psychotherapy. Some patients may desire a different type of psychotherapy from the very start. It is therefore important for the therapist to present the CB treatment properly to the patients before initiation, to explain the techniques and principles as well as its effectiveness in detail. Patients who complete tasks frequently and use the CBT techniques achieve best results in long-term follow-up. Patients who refuse to accept the principles of CBT (homework, records, diaries etc.) as part of pain management, insist on an unrealistic goals for the therapy *("It must never hurt again!"*), or have very low motivation, will not benefit from the treatment. The team should also consider the use of CBT in patients who have already undergone it.

TECHNIQUES

The basic steps in KB therapy are the following: 1. preliminary examination; 2. detailed examination; 3. behavioral, cognitive and functional

analysis of the problem, verbalization and definition of the problem; 4. goals of the therapy, evaluation of existing pain coping skills; 5. therapy: creating a therapeutic plan, teaching of new skills, pain relapse prevention; 6. end of therapy; 7. aftercare and follow-up. Chronic pain management uses two fundamental approaches that will be described below: cognitive restructuring and training in pain and stress coping skills (Turner and Romano, 2001).

1. Cognitive restructuring. Chronic pain patients can have unrealistic and negative beliefs and opinions about their pain, themselves, the world and their future. It is therefore important to focus on identifying, evaluating and modifying negative thoughts, images and expectations in the following four areas. 1. pain beliefs: patients with chronic pain may develop a global view on how pain has affected their lives. Many patients enter therapy with negative expectations. Examples: *"My pain is untreatable. I cannot control my pain in any way. The pain is horrible and unbearable. My life is full of pain, the pain has taken all of my past life from me. Nothing and no-one, not even you, can help me anymore, in any way."* 2. beliefs about self: in a person suffering from chronic pain, his or her perception of their identity may change over time. Some patients, for instance, may not be able to return to their original work because their profession was a physically demanding one. Examples of such beliefs include: *"My pain has made me a weak person. I am vulnerable. I am powerless. The pain is useless for me. I cannot be helped any more".* Patients may also develop various beliefs about their own body. For example: *"My body is completely broken. I am not functioning any longer. I have grown old. I am crippled".* 3. beliefs about the world: some patients begin to think more, asking themselves questions concerning their relationships with others that have changed as a result of their chronic pain. Although being treated, they are impatient, affecting relationships not only with the medical team, but also with their partners and family. Some of them believe that others will reject them because of their physical limitations and pain. Examples of negative beliefs about the world include: *"My doctor does not care about me and is not treating me; I should have been pain-free long ago. No one can understand what I am going through. People will criticize me. The world is against me. People are disappointed in me."* 4. beliefs about the future: patients imagine how bad and gloomy their future with chronic pain will be. Examples of beliefs about the future

include: *"My future looks grim. All I can see ahead of me is pain."* Negative and unrealistic thoughts and images contribute to physical and emotional suffering as well as to self-destructive behaviors. With irrational thinking and evaluation of pain, the individual has a greater tendency to develop a negative self-image, and negative views of the world and the future, which leads to feelings of despair, powerlessness and, through a vicious circle, to the worsening of symptoms. If, under the influence of chronic pain, dysfunctional schemas are activated in a pre-disposed individual, this may manifest as the occurrence of automatic negative thoughts (ANTs). These do not assess reality objectively, but in a distorted way *("I cannot do anything with pain"*). A chronic pain patient who has a tendency for ANTs *("The pain is horrible, and it will never be better. I will be end up in a wheelchair anyway!"*) will benefit from cognitive restructuring. It is necessary to explain to the patient that emotional responses to pain are influenced by his or her thinking. ANTs may also be a direct response to an increase in pain intensity: *"Something is wrong, something wrong is happening to me.", "The pain will end with hospitalization and another operation."* If the patient understands the relation between thoughts and emotions, learns to identify ANTs, evaluate them and find alternative, "reasonable" answers, it affects the emotional and behavioral as well as the somatic components of pain.

2. Coping with pain and stress helps the patient build up a repertoire of skills for effective coping. This includes the techniques of education, self-instruction, relaxation, activity increase, exposure, problem solving, relapse coping etc. Education by a doctor, nurse, psychologist or physiotherapist usually forms part of a comprehensive pain treatment plan (Williams and Harding, 1995). It starts with topics about diagnoses that are associated with chronic pain (back pain, arthritis, complex regional pain syndrome, orofacial pain, headaches, etc.), and further continues with causes of the occurrence of pain, the role of diagnostic and therapeutic approaches, explanation of the biopsychosocial model of chronic pain (somatic and psychosocial factors during the onset and maintenance of pain), and the relationship between stress, tension and pain. Education leads to a better understanding of the patient's own problems with chronic pain. Adaptive positive self-instruction means managing increased pain or stress with adaptive thoughts based on the principle of self-

suggestion, for example: *"I will cope with this!", "Focus on relaxation!", "Tension is here for me to use my coping skills!", "This won't last long, take it easy, you will manage this!"*. The patient is told that anxiety and tension can increase pain as well as focusing attention on pain. The level of anxiety is influenced by the way in which the person assesses the unpleasant experience with pain at a given moment, for example: *"Will I manage this?", "This is horrible, I can't bear the pain!"* It is therefore also possible to decrease the anxiety and tension by thought replacement. Self-instruction is helpful in all stages of pain management: 1. in preparation for pain: *"Think of what you can do, worrying and fear will not help reduce the pain!"*, 2. when confronting unpleasant feelings: *"I can think of something more pleasant than pain!"*, the 3rd stage involves managing intense pain: *"I can manage any pain with correct breathing and relaxation. I can manage this, I will pull through it!",* 4. in the final stage, self-instruction is used when looking back: *"I managed it well, good job!".* Relaxation and imagination. Patients who respond to stress with increased anxiety, muscle tension and pain may benefit from relaxation. With regular relaxation, the patient may achieve a reduction in stress, tension and pain, a distraction of attention from pain and improvement in sleep. Increasing activity. The patient uses diaries to record all activities (the belief that he or she "does not do anything, cannot manage anything with the pain" is thus challenged), recording at the same time what mood he or she was in and how he or she enjoyed the activity. The next step is the planning of activities for the following day and gradual inclusion of activities that he or she does not enjoy so much. That modifies thoughts such as "*I am good for nothing with the pain"* or *"I cannot manage anything with the pain!".* In chronic pain patients, a gradual increase in activities is combined with rehabilitation; body building and stretching exercise are used, exercise is gradually intensified (*pacing*), and exposure is thereby employed at the same time. Mastery of each step is reinforced with rewards. Exposure. Exposure in vivo is most suitable for reducing fear of pain and movement. First of all we measure the fear, find out in which situations it occurs, explain how fear develops and how it manifests in the somatic, cognitive and behavioral domain. We focus on the particular problem of the patient in connection with pain: for example, fear of riding an exercise bike, of bending forward, fear of rehabilitation exercise etc. With the patient, we line up the feared

situations in a hierarchy from the simplest to the most difficult, and using exposure we escalate the difficulty. The patient himself or herself will set up the goal of therapy, revised by the therapist, for instance: to walk the dog in the park every day at 3:10 p.m. without any fear of pain, manage to talk to other people during this, smile and be in a good mood etc. The PHODA (Photograph Series of Daily Activities) method can be advised to be used for the diagnosis and planning of exposure in vivo therapy in patients with pain-related fear (Kugler et al., 1999). Chronic pain patients also benefit from anxiety treatment. We can intentionally provoke anxiety symptoms and subsequently teach the patient to relax: in this way he or she will find out that the consequences he or she is afraid of (*"My back aches, I cannot exercise, or I will end up on an operating table, I will go crazy…!")* will not follow. Gradually, we may provoke positions, situations or behaviors that provoke increased anxiety in the patient and, with the help of other techniques such as cognitive restructuring or self-instruction, anxiety can be reduced. This should be performed with the assistance of a rehabilitation doctor or physiotherapist. Reduction in anxiety allows patients to rehabilitate effectively. Structured problem solving. Improvement in the ability to solve problems leads to a decrease in the overall level of anxiety. Preparing the patient for relapse (increasing the intensity of pain, anxiety or depression). At the beginning of therapy, patients often have unrealistic expectancies about getting rid of pain forever, but an increase in pain, anxiety or depression may occur in the course of as well as after the end of therapy. Unrealistic expectancies such as *"The pain will never reappear!"* may result in disappointment, and the pessimistic *"I will never get rid of the pain, no one will ever help me!"* leads to depression. It is therefore necessary to identify all behaviors, emotions, thoughts and physiological reactions with an impact on increasing pain intensity. The therapist and the patient will cooperate to identify the "red flags", i.e., situations that were associated with an increased intensity of pain or stress in the past. Adaptive relapse coping comprises two parts: 1. preparation for an increased intensity of pain and 2. strategies used at the time of increased pain.

MULTIDISCIPLINARY PROGRAM

CBT is organised in pain management centres of the highest level as a multidisciplinary pain management program conducted by a team of experts (anesthesiologist, clinical psychologist, physiotherapist, nurse) trained in CBT. All members of the team have equal status. The whole multidisciplinary pain management team meets to evaluate current problems, the course of the programme and the treatment; they also meet with every new patient following the initial and complex algesiological, psychological, physiotherapeutic examination and occupational counseling to evaluate the expected effect of treatment and motivation for the patient's participation in the program; they also meet with every patient once a week for treatment evaluation, and, as needed, to communicate with doctors who recommended the patients for the program. The programs vary in content and duration and are adapted to groups of individuals with a particular diagnosis (headaches, back pain, fibromyalgia, rheumatoid arthritis). The accessibility of multidisciplinary pain management programs is limited by the financial situation of the health care system and by the staff who should undergo training in CBT. In therapy, it is not the concrete contents of each individual session of the programme that is important, but the factors structuring the therapy. The basic factors that are preconditions for a successful multidisciplinary pain management program are described below.

Direct positive reinforcement of pain behavior. The overall apparent behavior of the individual (tone and contents of verbal expression, gait and posture, facial expression, and medical care utilization) gives others information about pain. The consequences of pain behavior are harmful to the patients themselves and increase their suffering. CBT is therefore focused on situations at home, at work and in healthcare institutions where the patient is directly reinforced for pain-related behavior. For example: a patient may leave work whenever she suffers from headache. If a patient feels the onset of back pain, he does not have to participate in household duties and goes to bed. Moaning and crying at the doctor's office due to pain always results in an increased level of care from the doctor, the nurse puts the patient on a bed, measures his or her blood pressure, the doctor devotes more time to the patient, or the patient is kept at the day care centre for monitoring. CBT seeks to minimize these effects.

Indirect positive reinforcement of pain behavior. Avoidance behavior is the most common form of reinforcement of pain and disability. The patient will avoid pain in situations which provoke the pain because he or she believes that the pain is reduced by avoiding it. Avoidance behavior, however, actually

increases the intensity of pain. The patient develops a constant pattern of activity: he or she is active when feeling good and less active if he or she feels higher pain intensity. After a certain time, this pattern inevitably leads to a stable decline in activity. In the course of CBT, the maladaptive patterns of avoidance behavior are replaced by encouraging the patient to exhibit time-contingent behavior (for instance, to change their position every 15 minutes from sitting to standing and vice versa) and draw up plans for attainable goals. Every success is reinforced by reward (Eccleston, 2001).

Positive reinforcement of required behavior. Insufficient reinforcement of healthy behavior inhibits and reduces mental well-being. CBT therefore focuses on identification and reinforcement of healthy (adaptive) behavior and encourages patients in adaptive behavior. Family members are also trained in how to react to an individual's needs and how to appreciate his or her balanced physical as well as emotional state.

Physical condition. A chronic pain patient is lying down or sitting all day long and starts to realise that he or she does not function physically: the person is more and more tired and loses breath even during minimum activity (walking one floor upstairs). However, he or she perceives these problems as pain-related and potentially harmful. Improvement in general physical condition can reduce tiredness as well as other somatic symptoms, including pain. It is often the increase in physical condition that represents the first positive reinforcement for a patient in CBT.

Cognitive reframing. Patients are steered towards discovering the automatic nature of negative, catastrophizing and self-degrading thinking patterns. Subsequently, they test the substantiality of these thinking patterns and assumptions that these thoughts are based on. In this way, the impact of thoughts on emotions and vice versa is understood. Cognitive restructuring is performed along with the teaching of communication skills, identification of problems and their solution, stress management and relaxation training.

Education and reinforcement. Education provides directions for the patient to be able to understand pain and to influence it to a certain extent. Thus, it reduces the emotional and evaluative component of pain (Strong and Unruh, 2003).

Besides the above six therapeutic principles, there are other factors that influence the process of therapy success. Therapy needs to be conducted in a structured way and on the basis of consistent CB principles. Therapy will be more effective if all staff members of the Pain Management Centre are trained in CBT, the team is regularly supervised and if there is no need to assure stable pharmacotherapy – changes in the middle of the CBT program may negatively

affect the development of adaptive self-reinforcement and self-instruction behavior.

EFFECTIVENESS

CBT has been applied in a number of diagnoses: back pain, headaches, fibromyalgia, rheumatoid arthritis, orofacial pain and others. CBT in pain management represents, in comparison with control groups and groups of patients on the waiting list, the most effective tool to help remove impaired cognitive schemas, teaches adaptive behavior and coping, reduces pain behavior, anxiety, fear and catastrophic interpretation of somatic symptoms, increases activity and self-confidence and improves social roles (Flor et al., 1992; Eccleston et al., 2002; Turner et al., 1996; Turner et al., 2007). A systematic assessment of 33 controlled studies of CBT in adults (not including headaches) also showed a permanent reduction in pain intensity (Morley et al., 1999).

CBT effectiveness is related to the structure of CBT, multidisciplinary programs and also with the competences and training of the entire team in CBT. On the other hand, neither standards for CBT in chronic pain treatment, nor therapy audits exist. Effectiveness is negatively influenced by the variability of chronic pain states (headaches, back pain, joint pain…); small or different patient sample sizes; different time course of therapy (5 to 6 sessions on average, but ranging from 3 to 15); variability in the CB techniques used as well as of statistical processing (Keefe and Van Horn, 1993; Parker et al., 1993). The effects of therapy may be positively influenced by familiarizing the patient with CBT effectiveness prior to treatment: patients with multiple diagnoses (Basler and Rehfisch, 1990), with headaches (Gutkin et al., 1992), or mixed pain (Parker et al., 1988) who were motivated for treatment showed more significant improvements than patients who were forced to undergo treatment. Thus, effectiveness of CBT increases when the attending physician, or the family encourage the patient to undergo psychotherapy. CBT may not be effective in patients whose health condition is complicated by court proceedings or by enforcement of compensation and social benefits, in addicted patients or patients whose pain behavior is reinforced by their domestic environment. CBT is more effective if applied in the early phase of chronic pain and if it is a part of a multidisciplinary program.

CBT has its limitations, too, which have an impact on its effectiveness: some chronic pain patients, although well selected and motivated, do not

benefit from the treatment; we cannot predict with absolute certainty which patients will be helped by CBT and which will not; the specific mechanisms of the therapy remain unknown in some cases, and in many parts of the world, CBT is not available at the time of need, or is not available at all. Further research faces the challenge of rethinking whether chronic pain therapy should be focused on the analgesic effect or rather on the rehabilitation process (Morley et al., 2013). Therapy should be based on an explicit theoretical model that leads to the selection of therapeutic techniques, the extent and quality of care, the methodological quality of the studies and standard statistical processing.

CONCLUSION

The operant approach opened the possibility of managing pain as a behavior problem (in relation to the patient's external environment) and stimulated the development of behavioral methods. The cognitive behavioral approach introduced the investigation of mental processes, and therapeutic methods focused on the modification of thinking and images to improve emotional and behavioral functioning. Current CB pain therapy is holistic, structured and targeted at the individual's quality of life. Patients learn the basic skills for managing pain as well as pain-related psychosocial problems. Effectiveness of CBT has been shown in all the modalities of pain (static, emotional, cognitive and behavioral). CBT should therefore be an integral part of chronic pain management.

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