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Integrating Pain Management in Clinical Practice

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Abstract

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There is much evidence to suggest that psychological and social issues are predictive of pain severity, emotional distress, work disability, and response to medical treatments among persons with chronic pain. Psychologists can play an important role in the identification of psychological and social dysfunction and in matching personal characteristics to effective interventions as part of a multidisciplinary approach to pain management, leading to a greater likelihood of treatment success. The assessment of different domains using semi-structured clinical interviews and standardized self-report measures permits identification of somatosensory, emotional, cognitive, behavioral and social issues in order to facilitate treatment planning. We briefly describe measures to assess constructs related to pain and intervention strategies for the behavioral treatment of chronic pain and discuss related psychiatric and substance abuse issues. Finally, we offer a future look at the role of integrating pain management in clinical practice in the psychological assessment and treatment for persons with chronic pain.

Keywords: Chronic pain, assessment, coping, behavioral, psychological interventions, substance abuse

Background and Overview of Pain Issues

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The International Association for the Study of Pain defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage” ([Pengel, Maher, & Refshauge, 2002](#)). This definition recognizes that pain is an emotional as well as a sensory phenomenon. Pain is now regarded as the 5th vital sign in medical examinations and is the most common reason to see a physician. Epidemiological studies have independently documented that chronic noncancer pain is an immense international problem ([Ehrlich, 2003](#); [Fordyce, 1995](#)). It has been estimated that one out of every three individuals will experience chronic pain at some point in their lifetime. Chronic pain accounts for 21% of emergency department visits and 25% of annual missed workdays. Including both direct and indirect costs, chronic pain imposes the greatest economic burden of any health condition ([Ferrari & Russell, 2003](#); [Stewart, Ricci, Chee, Morganstein, & Lipton, 2003](#)). Persistent back pain in particular is one of the principal drivers of these costs, both in the U.S. ([Becker, et al., 2010](#)) and internationally ([Hoy, et al., 2010](#)), with indirect costs (e.g., lost or

reduced work productivity) accounting for more than half of this economic burden ([Phillips & Harper, 2011](#)). In addition, the presence of a long-lasting pain syndrome is a leading risk factor for suicide, and psychosocial variables play crucial roles as risk factors or protective factors for suicidality in pain patients ([Edwards, Bingham, Bathon, & Haythornthwaite, 2006](#)).

Chronic pain, generally defined as pain persisting for more than 6 months, or past the normal healing time, is a costly problem that influences every aspect of a person's quality of life, interfering significantly with sleep, employment, social functioning, and activities of daily living. Patients with persistent pain often report depression, anxiety, irritability, sexual dysfunction, and decreased energy ([Jamison, 1996](#)). Family roles are altered, and worries about financial limitations and the consequences of a restricted lifestyle abound ([Chapman, Jamison, & Sanders, 1996](#); [Linton, 1998](#); [Ohman, Soderberg, & Lundman, 2003](#); [Otis, Cardella, & Kerns, 2004](#); [Soderberg, Strand, Haapala, & Lundman, 2003](#)).

Optimal care of patients requires attention to the factors that determine the experience of pain and related disability. Physical pathology arising from injury and disease and the general physical status of the patient are necessarily the immediate focus of attention, but psychological and social wellbeing also are important determinants of pain and pain-related disability. Psychological and social issues often complicate the lives of people suffering from both pain that is attributable to physical pathology and pain for which physical pathology cannot be identified despite intensive medical investigation. Part of what some have termed "the puzzle of pain" is the broadly consistent finding of minimal relationships between observed physical pathology and an individual's report of the experience of pain. Even in the context of pain conditions in which the pathological cause of the pain seems obvious (e.g., osteoarthritis (OA)), "objective findings" such as knee X-rays and patient-reported symptoms (e.g., pain) are at best modestly correlated ([Bedson & Croft, 2008](#); [Gwilym, Pollare, & Carr, 2008](#)). For example, surveys of knee OA patients awaiting joint replacement have revealed no significant associations of radiographic scores with pain or function ([Barker, Lamb, Toye, Jackson, & Barrington, 2004](#)); similarly, analyses of large data sets such as the National Health and Nutrition Examination Survey (NHANES) ([Hannan, Felson, & Pincus, 2000](#)) have indicated that among subjects with radiographically defined stage 2–4 knee OA, less than half reported any knee pain. Moreover, among all individuals who did report knee pain, only a fairly small percentage (15%) had radiographic stage 2–4 OA ([Hannan, et al., 2000](#)).

When applied to pain patients psychological assessment is designed to identify problematic emotional reactions, maladaptive thinking and behavior, and social problems that contribute to pain and disability. As psychosocial issues are identified, treatment can be tailored to addressing these challenges in the patient's life, thereby improving the likelihood and speed of recovery and prevention of ongoing or more severe problems. Pain patients are also not typically passive participants, but want to be informed about their care and seek out information about their condition from a number of different sources including the Internet. Information obtained through the Internet or elsewhere, whether reliable or not, can influence expectations about outcomes from pain management practices ([Nettleton, 2004](#); [Nettleton & Hanlon, 2006](#); [Podichetty, Weiss, Fanciullo, & Baird, 2007](#); [Washington, Fanciullo, Sorensen, & Baird, 2008](#)). Addressing expectations and understanding issues of acceptance and coping are also important components of the psychological makeup of chronic pain ([Thompson & McCracken, 2011](#)).

Pain Assessment Considerations

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A number of important factors must be considered in the psychological assessment of persons with pain. It is first important to recognize that the sensation of pain is a multifactorial personal experience that cannot be measured objectively. Because pain is a subjective state, its measurement can only rely on what the patient says and does in response to pain. We also know that a number of psychosocial

factors contribute to pain. These include attitudes, beliefs, cultural norms, mood, focus of attention, motivation, and personality traits ([Jamison, 1996](#)). For example, persons who are anxious or depressed tend to report more intense pain than those who are experiencing minimal emotional distress ([Edwards, Calahan, Mensing, Smith, & Haythornthwaite, 2011](#)). Conversely, persons with pain who have adequate psychological functioning exhibit a greater tendency to ignore their pain, use coping self-statements, and remain active in order to divert their attention from their pain ([Jensen & Karoly, 1991](#)). Because pain is a complex, subjective experience, multiple measures of pain and psychosocial function are needed to reliably assess someone with persistent pain.

It is also generally unwarranted to assume that psychological factors are the cause of pain. Some still hold to the Cartesian notion that pain is a physiological response to tissue damage ([Main & Spanswick, 2000](#)). If there are inadequate physical findings to account for a report of chronic pain, such pain is mistakenly interpreted to be a largely psychological phenomenon. We know, however, that profound reactive changes in quality of life are associated with intractable chronic pain. Significant interference with memory, sleep, employment, social functioning, and daily activities are common. Chronic pain patients frequently report sexual dysfunction, and decreased energy. Family roles are altered, and worries about financial limitations and future consequences of a restricted lifestyle are prevalent. Chronic pain patients often present with a history of multiple medical tests with minimal physical findings, and clinicians are tempted to conclude, often wrongly, that psychological factors are the major precipitating cause for pain.

Attempts to reliably distinguish between organic and psychogenic pain have been largely unsuccessful. Most pain specialists recognize that chronic pain is an interactive biopsychosocial phenomenon with biomedical, psychological, social, and behavioral influences. However, some clinicians still place most emphasis on the biomedical component of pain and perceive this information as separate from psychological factors. They also mistakenly believe that the results of standardized psychometric measures will reflect whether someone's chronic pain is related to a psychogenic pain problem. Unfortunately, a psychological evaluation cannot be relied upon to identify psychogenic pain.

Psychological evaluations should necessarily include the assessment of sensory, affective, cognitive, and behavioral components of the pain experience, and identification of personality and psychosocial factors that can influence treatment outcome ([Jamison, et al., 2011](#)). The sensory experience is usually best understood through description of the severity, location and temporal characteristics of chronic pain. Distressing emotional qualities of the experience of pain as well as pre-existing emotional dispositions need to be understood, as fear ([Vlaeyen & Linton, 2000](#)) and depression ([Edwards, et al., 2011](#)) are powerful determinants of the responses to pain, related disability, and care. Patterns of thinking may exacerbate and maintain dysfunctional pain as well as facilitate coping that enhance adjustment during painful flare-ups. There is variability in the extent to which chronic pain interferes with activities of daily living or contributes to substantial functional impairment. Clinicians have long relied upon careful appraisal of nonverbal behavior in the course of physical examinations and through observation of patients outside the examining situation, for example, when engaged in spontaneous behavior elsewhere in clinics or in everyday situations. Self-report can also be useful in assessing behavior by focusing upon overt activity rather than subjective experience, for example, functional capacity or competence and disability in different situations. Finally, family socialization and important life experiences influence both effective and ineffective patterns of attempts to cope with pain. History gathering typically is the primary source of this information. Ethnic and cultural variation and family histories of managing pain and illness may be of importance. For example, when significant others in a person's family have had a history of recurrent, persistent, or particularly severe pain, there is a disposition to similar patterns of the patient ([Hermann, Hohmeister, Zohsel, Ebinger, & Flor, 2007](#)).

The initial assessment of a chronic pain patient entails assembling separate pieces of information and abstracting from them a prognosis and the best course of treatment. Important components that must be evaluated in this process include pain intensity, levels of function, mood and personality, coping and pain beliefs, co-morbid medical problems and medication usage. In addition, a behavioral analysis should be conducted, and information should be obtained on psychosocial history, adverse effects of treatment, and health care utilization. In one commonly encountered scenario, a patient is injured at a job that requires heavy lifting and bending. The person experienced a sudden pain while lifting a particularly heavy object. During a few months of rest and recovery, the individual may have believed that the “muscle strain” would heal itself. After months or years of being evaluated by physicians and other health care professionals and after unsuccessful treatments and attempts to return to work, the person begins to show signs of considerable emotional distress, including depression, anxiety, and anger. Often there are feelings of helplessness, low self-esteem, and isolation. Although chronic pain patients may exhibit certain personality traits that might contribute to their inability to cope with a chronic disabling condition, these traits do not always suggest significant psychopathology. Perhaps, this explains in part why some traditional assessment techniques of psychopathology have not been shown to be effective for assessing chronic pain patients and supports the assertion that measures that more reliably evaluate the degree of negative affect are called for.

Semi-Structured Interview

The most popular means of evaluating the psychological state of a chronic pain patient is a semi-structured interview ([Bradley & McKendree-Smith, 2001](#)), the results of which may frequently be given significant weight in treatment decisions. Self-report questionnaires and pain assessment programs can be used as adjuncts to the interview. Before meeting with the patient, the interviewer should review all referral information, including discharge summaries, testing results, previous physicians' notes, and medical and psychosocial history reports. Each of the following categories should be assessed during the interview: (1) pain intensity and description, (2) aggravating factors, (3) sleep and daily activity level, (4) relevant medical history, (5) social history, (6) past and current treatments, (7) education and employment history, (8) disability and compensation status, (9) history of drug or alcohol abuse, (10) history of psychiatric disturbance and past emotional trauma, (11) current emotional status, suicidal ideation, cognitive function and perceived support, and (12) motivation to take an active role in treatment.

Preliminary demographic and medical history information can be obtained through the completion of a comprehensive questionnaire ([Karoly & Jensen, 1987](#); [Main & Spanswick, 2000](#)) either on paper or as an electronic assessment program ([Jamison, et al., 2003](#); [Pengel, et al., 2002](#)). Additional information can be clarified at the time of the interview. It is important to consider and acknowledge factors such as the patient's gender, race, cultural background, and beliefs, all of which can greatly influence a person's perception of pain and coping mechanisms. Whenever possible, the patient's family members and/or significant other should also be interviewed.

Behavioral Analysis

A thorough behavioral analysis is important in the successful rehabilitation of each chronic pain patient. Fordyce ([Fordyce, 1976](#)) one of the early proponents of behavioral assessment, put forward the learning theory of chronic pain, which highlights the important distinction between what pain patients say and what they do. Instead of relying solely on subjective measures of chronic pain, investigators should also evaluate objective, observable manifestations of how the patient responds to pain. A significant component of the learning theory of chronic pain is the distinction between “well” behaviors and “pain” behaviors. Further, it is essential to identify factors that perpetuate pain behaviors ([Shankland, 2011](#)). Many recent behavioral observation studies have focused on facial expressions in response to pain ([Prkachin, 2009](#)). To date, a number of observational systems have been developed for

evaluating pain-related facial expressions in a relatively “objective” manner. Early studies used the Facial Action Coding System to characterize the facial expressions of adults responding to a variety of pain induction tasks. Numerous elements of facial expressions (e.g., upper lip raising, mouth opening, eye closure) were found to be related to pain ratings, and the relative consistency with which the same actions were associated with pain across numerous samples supported the concept of a potentially universal set of “pain expressions.” Indeed, striking similarities have been observed between the facial actions associated with pain in middle-aged adults, the elderly, children, and neonates ([Prkachin, 2009](#)). This commonality of pain-related facial expression suggests that it may be a crucial assessment tool in situations in which verbal report is unavailable, as is the case with very young children, or individuals with verbal communication deficits.

The first step in behavioral analysis is to identify overt behaviors in pain patients, including posturing, limping, over reliance on pain medication, cervical collars, back braces, canes, and so on. All of these behaviors are observable and tend to perpetuate a disability identity. Other components of a behavioral analysis include self-monitored observations and use of automated devices ([Marceau, Smith, & Jamison, 2011](#)).

Additional Assessment Tools

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Pain Intensity Measures

Because one of the obvious primary goals of treatment for chronic pain is to decrease the intensity of the pain, it is important to monitor pain intensity both for a period before and throughout the course of treatment. There are a number of ways to measure pain intensity, including numerical pain ratings, visual analogue scales, verbal rating scales, pain drawings, and a combination of standardized questionnaires. Pain intensity rating methods have evolved from designs originally developed by Budzynski (1973) and Melzack (1975). A number of studies have shown that self-monitored pain intensity ratings are both reliable and valid ([Follick MJ, 1984](#); [Jensen & Karoly, 2001](#); [Jensen MP, Turner JA, 1996](#)). The daily monitoring of multiple measures of pain intensity over a 1- to 2-week period before the start of therapy has a number of benefits. First, more information is obtained than can be gained from a single index of perceived pain intensity. More specifically, averaging multiple measures of pain intensity over time increases the reliability and validity of the assessment and is preferable to a single rating of pain intensity ([Jensen & Karoly, 2001](#); [Jensen MP, 1993](#)). Second, average pain intensity ratings can serve as a baseline to help establish whether continued treatment is needed after an appropriate trial period. Baseline measures are essential to making judgments about the overall impact of treatment for pain.

Numerical pain ratings often involve the patient's rating of his or her pain on a scale of 0 to 10 or 0 to 100. Ideally, the external validity of the measure is improved by descriptive anchors that help the patient understand the meaning of each numerical value. Another means of measuring pain intensity is the visual analog scale, which uses a straight line with extreme limits of pain at either end ([Karoly & Jensen, 1987](#)). This rating can be made either on paper (often 10 cm long) or on an electronic device (eVAS) ([Jamison, et al., 2002](#)). The pain patient is instructed to place a mark at the point on the line that best indicates present pain severity. Scores are obtained by measuring the distance from the end labeled “no pain” to the mark provided by the patient. Though evidence exists for the validity of the visual analogue scale ([Jensen & Karoly, 2001](#)), it can be less reliable with older people who have problems with hand-eye coordination ([Jamison, et al., 2002](#); [Jensen, Karoly, & Braver, 1986](#)).

There are a number of verbal rating scales ([Jensen & Karoly, 2001](#); [Karoly & Jensen, 1987](#)), that consist of phrases (as few as four or as many as 15, often ranked in order of severity from “no pain” to “excruciating pain”) chosen by the patients to describe the intensity of their pain. Other verbal scales can be used to describe the quality of pain (e.g., piercing, stabbing, shooting, burning, throbbing)

([Jamison, Vasterling, & Parris, 1987](#)). Despite their appeal, the VRS also exhibits a significant limitation, based on which other pain researchers have hesitated to recommend these scales. The scoring method for most VRSs assumes equal intervals between adjectives/phrases. That is, the change in pain from “none” to “mild” is quantified identically with the change in pain from “moderate” to “severe”. This assumption is rarely tested, and is likely often violated. This property of the VRS poses difficulties in both the interpretation and analysis of VRS-derived data.

Among the self-report measures, numerical rating scales are most popular among professionals. However, there is no evidence to suggest that VASs or verbal rating scales are any less sensitive to treatment effects. All these types of measures have been shown to be acceptable in the quantification of clinical pain ([Jensen & Karoly, 2001](#); [Karoly & Jensen, 1987](#)).

Providers' Assessment of Pain Intensity

A number of studies have examined the congruence between patients' and healthcare providers' assessments of pain. Collectively, healthcare providers are sub-optimal estimators of patients' pain symptoms. Several studies ([Grossman, Sheidler, Swedeen, Mucenski, & Piantadosi, 1991](#); [Thomas, Robinson, Champion, McKell, & Pell, 1998](#)) have documented no significant correlations between provider (nurse, fellow, etc.) and patient ratings of pain. Moreover, there is little evidence for the validity of expert judgments regarding the prognosis of patients in pain. For example, among back pain patients followed longitudinally, no relationship was observed between providers' estimates of patients' rehabilitation potential and actual rehabilitation outcomes ([Jensen, Bodin, Ljungqvist, Gunnar, & Nygren, 2000](#)).

In addition, health care providers tend to systematically under-estimate and under-treat pain-related symptoms across a range of providers, settings, and painful conditions. Interestingly, increased experience seems to further predispose providers to underestimate pain severity ([Tait, Chibnall, & Kalauokalani, 2009](#)). Fortunately, some studies have suggested that appropriate training and education can reverse this underestimation bias in longtime practitioners ([Tait, et al., 2009](#)).

Mood and Personality

Psychopathology and/or extreme emotionality have been seen as contraindications for certain therapies ([Block, 1996](#); [Main & Spanswick, 2000](#); [Savage, 1993](#)). Mental health professionals continue to debate the best way to measure psychopathology and/or emotional distress in chronic pain patients. Though most measures are helpful in ruling out severe psychiatric disturbance, unfortunately no measure can boast validity in predicting treatment outcome. The measures most commonly used to evaluate personality and emotional distress include the Minnesota Multiphasic Personality Inventory (MMPI-2) ([Bradley LA, 1978](#); [Hathaway, et al., 1989](#); [Prokop CK, 1980](#)), Symptom Checklist 90 (SCL-90-R) ([Derogatis & Melisaratos, 1983](#)), Millon Behavior Health Inventory (MBHI) ([Millon, Green, & Meagher, 1979](#)), Illness Behavior Questionnaire (IBQ) ([Pilowsky & Spence, 1975](#)), Beck Depression Inventory (BDI-II) ([Beck & Steer, 1993](#)), Center for Epidemiologic Studies Depression Scale (CES-D) ([Radloff, 1977](#)), Hospital Anxiety and Depression Scale (HADS) ([Zigmond & Snaith, 1983](#)) and Pain Catastrophizing Scale ([Sullivan, 1995](#)).

The MMPI ([Hathaway, et al., 1989](#)) is the instrument in the past that had been commonly used in assessing patients, but is now not incorporated in assessing pain patients for a number of reasons. This measure consists of 567 true-false items and yields a distinct profile for each pain patient. Studies have shown that these profiles can predict return-to-work in males as well as response to surgical treatment ([McCreary, 1985](#)). The shorted MMPI is also available ([Gass & Luis, 2001](#)). Unfortunately, the profiles obtained can be misinterpreted because of the physical symptoms frequently reported by these patients ([Moore, McFall, Kivlahan, & Capestany, 1988](#)), and patients with chronic pain tend to dislike the test's

emphasis on psychopathology. Nonetheless, certain outside sources may request the results of an MMPI, particularly if an evaluation is needed for legal proceedings.

The SCL-90 is a 90-item checklist with a 5-point scale that offers a global index score as well as nine subscale scores as a general assessment of emotional distress. It is a relatively brief measure that offers easy inspection of individual items that may pertain specifically to persons with chronic pain. However, its disadvantages include the high correlation between subscales and the absence of validity scales to detect subtle inconsistencies in responses ([Jamison, Rock, & Parris, 1988](#)).

The MBHI, another popular measure for assessing mood and personality, includes 150 true-false items and offers 20 subscales that measure (1) styles of relating to providers, (2) psychosocial stressors, and (3) response to illness. The advantage of the MBHI is that the scales are not subject to misinterpretation due to physical symptoms. Unlike other measures, the MBHI emphasizes medical rather than emotional concerns.

The IBQ is commonly used to assess emotionality and illness behavior in chronic pain patients. This questionnaire includes 62 true-false items and yields 7 subscales measuring symptoms and abnormal illness behavior. Patients whose organic pathology does not account for their pain tend to have higher IBQ scores. The IBQ is also correlated with anxiety measures.

The BDI-II ([Beck & Steer, 1993](#)) assesses depressive symptoms in chronic pain patients. This 21-item self-report questionnaire measures the severity of depression and is commonly used to evaluate the outcome of treatment. It is easy to administer and score, though one limitation is the potential for misinterpretation of an elevated depression score as a result of the frequent endorsement of somatic items (e.g., fatigue, sleep disturbances, and loss of sexual interest) by chronic pain patients.

The CES-D is an additional tool for assessment of depressive symptoms in pain patients ([Radloff, 1977](#)). The CES-D is a self-report measure of depression consisting of 20 items rated on a 0–3 scale reflecting depression symptomatology. The alpha coefficients range from .85 for a general population to .90 for a psychiatric population. The CES-D is perceived as a useful measure of depression for patients with chronic illnesses because of fewer items with somatic content. The CES-D is found to have good sensitivity and specificity in discriminating between patients with chronic pain who do or do not have major depression ([Santor, Zuroff, Ramsey, Cervantes, & Palacios, 1995](#)). The 10-item short-form version of the CES-D is also available ([Andresen, Malmgren, Carter, & Patrick, 1994](#)).

The HADS ([Zigmond & Snaith, 1983](#)) is a 14-item scale designed to assess the presence and severity of anxious and depressive symptoms. Seven items assess anxiety, and seven items measure depression, each coded from 0 to 3. The HADS has been used extensively in clinics and has adequate reliability (Cronbach's Alpha = .83) and validity, with optimal balance between sensitivity and specificity ([Zigmond & Snaith, 1983](#)). It has been translated into many languages and is widely used around the world in clinical and research settings.

Catastrophizing is a negative cognitive and emotional response to pain that involves feelings of helplessness when in pain, a tendency to ruminate about pain, pessimism about pain-related outcomes, and a propensity to magnify the threat value of pain. The PCS ([Sullivan & Pivik, 1995](#)) is a well-validated, widely-used, self-report measure of catastrophic thinking associated with pain ([Edwards, et al., 2006](#)). The PCS has good psychometric properties in pain patients and controls ([Edwards, et al., 2010](#); [Van Damme, Crombez, Bijttebier, Goubert, & Van Houdenhove, 2002](#)). Catastrophizing exists on a continuum in the population ([Edwards, et al., 2006](#)), and even among adults with no history of chronic pain, higher levels of catastrophizing prospectively predict the future development of persistent spinal pain and greater healthcare costs ([Severeijns, Vlaeyen, van den Hout, & Picavet, 2004](#)).

Functional Capacity and Activity Interference Measures

Some clinicians consider pain reduction meaningless unless accompanied by a noticeable change in function. Thus, some reliable measurement of functional capacity should be used before the onset of therapy. Research has shown that physical impairment is not very predictive of disability, and that beliefs about injury predict physical performance better than pain ratings ([Turk, Okifuji, Sinclair, & Starz, 1998](#)). Measures that can be used to assess activity level and function include the Sickness Impact Profile (SIP) ([Bergner M, 1981](#)), Short-Form Health Survey (SF-36) ([Ware & Sherbourne, 1992](#)), West Haven-Yale Multidimensional Pain Inventory (WHYMPI) ([Kerns, Turk, & Rudy, 1985](#)), and Pain Disability Index (PDI) ([Pollard, 1984](#)).

The SIP is a 136-item checklist with 12 subscales measuring levels of physical and psychosocial functioning. Each item is weighted, and the scales are correlated with other functional capacity measures. Shorter versions of the SIP (e.g., the Roland and Morris Disability Questionnaire ([Roland M, 1983](#)) are also suitable for the assessment of function in chronic pain patients.

The SF-36, which was initially developed from the Medical Outcomes Study to survey health status ([Ware & Sherbourne, 1992](#)), includes eight scales that measure (1) limitations in physical activities due to health problems, (2) limitations in social activities due to physical and emotional problems, (3) limitations in usual role activities due to physical health problems, (4) bodily pain, (5) general mental health, (6) limitations in usual role activities due to emotional problems, (7) vitality (energy and fatigue), and (8) general health perceptions. The SF-36 is favored over the SIP because it is a shorter test with excellent reliability and validity. The SIP is preferred if the population being evaluated includes patients with extreme physical limitations.

The WHYMPI is a 56-item measure made up of 7-point rating scales. The subscales assess activity interference, perceived support, pain severity, negative mood, and perceived control. The advantage of this self-report instrument is that it was created specifically for chronic pain patients and can be useful in classifying those patients into three types: dysfunctional, interpersonally distressed, and adaptive copers ([Turk & Rudy, 1988](#)). Strong evidence supports the presence of these three types in the assessment of chronic pain patients ([Jamison, Rudy, Penzien, & Mosley, 1994](#)).

Other functional measures include the Oswestry Disability Questionnaire ([Leclaire, Blier, Fortin, & Proulx, 1997](#)), Chronic Illness Problem Inventory ([Kames, Naliboff, Heinrich, & Schag, 1984](#)), the Waddell Disability Instrument ([Waddell & Main, 1984](#)), the Functional Rating Scale ([Evans & Kagan, 1986](#)), and the Back Pain Function Scale ([Stratford & Binkley, 2000](#)). These measures will not be discussed in further detail in this paper.

Pain Beliefs and Coping

Pain perception, beliefs about pain, and coping mechanisms are important in predicting the outcome of treatment. Unrealistic or negative thoughts about an ongoing pain problem may contribute to increased pain and emotional distress, decreased functioning, and greater reliance on medication. Certain chronic pain patients are prone to maladaptive beliefs about their condition that may not be compatible with the physical nature of their pain ([DeGood DE, 1992](#); [Waddell, 1998](#)). Patients with adequate psychological functioning exhibit a greater tendency to ignore their pain, use coping self-statements, and remain active in order to divert their attention from their pain ([Jensen & Karoly, 1991](#)).

Since efficacy expectations have been shown to influence the efforts patients will make to manage their pain, measures of self-efficacy or perceived control are useful in assessing a patient's attitude ([Jamison, 1996](#)). A number of self-report measures assess coping and pain attitudes. The most popular tests used to measure maladaptive beliefs include the Coping Strategies Questionnaire (CSQ) ([Rosenstiel & Keefe, 1983](#)), Pain Management Inventory (PMI) ([Brown, Nicassion, & Wallston, 1989](#)), Pain Self-Efficacy Questionnaire (PSEQ) ([Lorig, Chastain, Ung, Shoor, & Holman, 1989](#)), Survey of Pain Attitudes (SOPA) ([Karoly & Jensen, 1987](#)), and Inventory of Negative Thoughts in Response to Pain

(INTRP)([Gil, Williams, Keefe, & Beckham, 1990](#)). Other instruments include the Pain Beliefs and Perceptions Inventory (PBPI)([Williams, Robinson, & Geiser, 1994](#)), and Chronic Pain Self-efficacy Scale (CPSS)([Anderson, Noel-Dowds, Pelletz, Edwards, & Peeters-Asourian, 1995](#)). Patients who have a high score on the Catastrophizing Scale of the CSQ, who endorse passive coping on the PMI, who demonstrate low self-efficacy regarding their ability to manage their pain on the PSEQ, who describe themselves as disabled by their pain on the SOPA, and who report frequent negative thoughts about their pain on the INTRP are at greatest risk for poor treatment outcome ([Turk & Melzack, 2001](#)). It is suspected that patients who have unrealistic beliefs and expectations about their condition are also poor candidates for pain treatment.

Quality of Life Assessment

Pain and discomfort can make a significant impact on perceptions of general health-related quality of life (QOL) ([Jamison, Fanciullo, McHugo, & Baird, 2007](#)). Those who are pain-free have significantly better QOL than those in pain. A longer duration of pain symptoms is associated with poorer QOL, and pain associated with increased emotional distress can be particularly detrimental. Assessment instruments should include a variety of social, psychological, and physical features in order to assess properly the QOL of persons with chronic pain.

A number of questionnaires, some of which have been adapted for computer use, have been developed to assess QOL from the patient's standpoint. Among the most widely cited are the General Health Questionnaire (GHQ) ([Bowling, 1997](#)), Sickness Impact Profile (SIP) ([Bergner M, 1981](#)) and SF-36 Health Survey ([Ware & Sherbourne, 1992](#)).

Questionnaires of this type have been used widely to compare the QOL of patients in chronic pain with that of healthy controls. The findings are clear and consistent in revealing the multi-factored impact of chronic pain on a person's perceived QOL. In fact, the health-related QOL of patients in chronic pain is among the lowest reported for any medical condition. In particular, low scores have been found for patients with pain due to chronic spinal disorders ([Claiborne, Krause, Heilman, & Leung, 1999](#)), multiple sclerosis ([Vickrey, Hays, & Harooni, 1995](#)), and headache (S. [Wang & Fuh, 2001](#)). Elderly patients with osteoarthritis also have impaired QOL compared with peers without chronic illness, especially in the parameters of physical status, vitality, social functioning, and general health ([Briggs, Scott, & Steele, 1999](#)). Relative to patients with diagnoses of chronic obstructive pulmonary disease, rheumatoid arthritis, atrial fibrillation, and advanced cancer, patients with fibromyalgia have been found to have lower scores on the Quality of Well-Being Scale ([Kaplan, Schmidt, & Cronan, 2000](#)).

Monitoring Medication and Adverse Effects

Compliance is an important component in decisions about whether to continue, discontinue, or modify treatment for chronic pain. Clinicians ask patients to comply with their treatment protocol but are rarely prepared with a way to monitor compliance, particularly for medication usage. A patient's retrospective report of use of medication, although of value, is subject to inaccuracies ([Jamison, Sbrocco, & Parris, 1989](#)). Recall can be enhanced if the patient continuously monitors usage. In addition, both compliance and accuracy in reporting are improved if a family member assists with the monitoring. Medication records kept by patients often include the name of the medication, the date and time when it is taken, and the dosage ([Steedman, et al., 1992](#)).

Adverse effects should be monitored regularly during treatment for chronic pain. The monitoring of side effects related to medication use in clinical trials can be as important as the monitoring of pain intensity. Adverse effects are often specific to a given medication. Opioid therapy, for instance, may contribute to constipation, tiredness, nausea, dizziness, itching, urinary retention, and breathing problems. Medications also influence mood and cognitive abilities ([Banning, Sjogren, Kaiser, & Sjogren, 1992](#); [Bruera, MacMillan, Hanson, & MacDonald, 1989](#); [Kerr, et al., 1991](#)). Periodic

monitoring of adverse effects by means of a symptom checklist can provide relatively objective criteria useful in the assessment of treatment. Each symptom can be rated on a scale from 0 (absent) to 10 (most severe). Although patients frequently report adverse reactions to medication during the initial stage of treatment, many of these reactions diminish over time ([Jamison, Raymond, Slawsky, Nedeljkovic, & Katz, 1998](#)). Portable monitors using customized software have made the collection and storage of adverse effects and health behaviors both convenient and affordable. Some electronic diaries allow for two-way communication between patients and providers and are an efficient means of evaluating and tracking medication use and associated symptoms ([Jamison, et al., 2001](#)).

Electronic Monitoring

There has been a dramatic change in technology designed for use in pain assessment since the advent of personal computers. Today, handheld devices (PDAs and cell phones) can store more information than had previously been available. It is estimated that within a few years cell phones will be able to hold a terabyte of data (which is over a trillion bytes or 1,024 gigabytes). Computer chips are making the devices faster with decreasing costs. Because memory is inexpensive there is no need to be concerned about deleting data or losing data. The sizes of devices are also decreasing such that pocket-sized units can be taken everywhere. Many of these devices also have Internet access such that wireless networks can be accessed anytime and anywhere. Passive data collection such as body position, movement, temperature, heart rate and respiration with unobtrusive activity data recorders also currently exist for such activities as sleep and physical movement, which could be applied to pain tracking ([Stone & Shiffman, 1994](#)).

Comprehensive electronic pain assessment programs have the potential to encourage patients or physicians to modify treatment, or help patients to better understand their symptoms and symptom management ([Jamison, Fanciullo, & Baird, 2004](#); [Marceau, Carolan, Schuth, & Jamison, 2007](#); [Pouwer, Snoek, van der Ploeg, Heine, & Brand, 1998](#)). These programs can allow clinic staff to assess a patient's self-reported pain along with its psychological and emotional impact. Data could be immediately sent through the Internet to a central location and be accessed by clinicians anywhere. The programs also could have the capability to be integrated with electronic medical records ([Fanciullo, Jamison, Chawarski, & Baird, 2003](#); [Jamison, et al., 2004](#); [Jamison, et al., 2001](#)). Instant review of summary data by physicians as part of follow-up visits has the potential to be very valuable for tracking changes in pain, mood, activity interferences, and usefulness of treatment ([Marceau, Link, Jamison, & Carolan, 2007](#)). These programs would have the option of synthesizing the data into a summary document with treatment recommendations for the patients and providers. The programs could provide electronic or printed summaries of the pain data and offer providers treatment suggestion plans for each of the specific diagnoses as well as incorporate information about psychiatric and substance abuse history and co-morbid medical conditions. Many such programs are available or are currently in development to assess pain and quality of life (QOL) among chronic pain patients ([Burfeind, Fanciullo, Jamison, & Baird, 2005](#); [Fanciullo, et al., 2003](#); [Jamison, et al., 2007](#); [Marceau, et al., 2007](#)). Electronic assessments of QOL have also been found to be reliable and easy to use ([Fanciullo, Jamison, Chawarski, & Baird, 2001](#)). There are a number of computer systems and software programs currently being developed for use in the comprehensive assessment and management of pain. It is thought that these systems will advance our understanding of the public health impact of pain, improve the care individual patients receive, and help in educating providers ([Marceau, et al., 2007](#); [Podichetty, et al., 2007](#)).

Medical and Behavioral Management Strategies

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Many patients with chronic pain may present with several significant medical comorbidities that can affect the course of treatment. Some of the most common comorbidities include: asthma, chronic obstructive pulmonary disease, diabetes mellitus, coronary artery disease, hypertension, ulcers, kidney,

bladder, and liver problems, or cancer. When patients are asked to rate their level of pain, comorbid conditions may contribute to this rating.

Some individuals suffering from chronic pain have a history of unhealthy behaviors including minimal exercise, poor diet, and smoking cigarettes. Over time they experience weight gain and deconditioning. Many chronic pain patients are on multiple medications prescribed by multiple providers, which include blood thinners, blood pressure and heart disease medications, inhalers, and antidepressants. Several chronic pain patients have allergies and reactions to some medications. They may also have medical devices implanted, and wear prostheses. It is essential for clinicians to assess and identify current and past medical conditions to avoid any complications.

Psychological interventions for pain

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Chronic pain involves a complex interaction of physiological and psychosocial factors, and successful intervention requires the coordinated effort of a treatment team with expertise in a variety of therapeutic disciplines. Although some pain centers offer a unimodal treatment approach, most programs use a blend of medical, psychological, vocational, educational, and alternative treatment techniques ([Jamison, 1996](#)). Most interdisciplinary pain programs have as their core staff one or more physicians, a clinical psychologist, and a physical therapist. Other health professionals who may play important roles include clinical nurse specialists, occupational therapists, vocational rehabilitation counselors, and acupuncturists. The therapeutic aims of interdisciplinary interventions for chronic noncancer pain include decreased pain intensity, increased physical activity, controlled management of pain medication, a return to work, improved psychosocial functioning, and reduced use of health-care services.

Psychologists who offer cognitive behavioral therapy have a number of objectives of treatment. First is to help patients change their view of their problem from overwhelming to manageable. Patients who are prone to “catastrophize” benefit from examining the way they view their situation. What could be perceived as a hopeless condition can be reframed as a difficult yet manageable condition over which they can exercise some control. Relatedly, helping patients to realize that short-term increases in chronic pain do not necessarily signal tissue damage, or progressing pathology, can help to reduce unnecessary healthcare visits and increase the likelihood that patients will adopt healthier behavior patterns such as regular exercise. A second objective is to help convince patients that the treatment is relevant to their problem and that they need to be actively involved in their treatment and rehabilitation. A third objective is to teach patients to monitor maladaptive thoughts and substitute more realistic, functional thoughts. Persons with chronic pain are plagued, either consciously or unconsciously, by negative thoughts related to their condition. These negative thoughts have a way of perpetuating pain behaviors and feelings of hopelessness. Demonstrating how and when to attack these negative thoughts and when to substitute more realistic thoughts and adaptive management techniques for chronic pain is an important component of cognitive restructuring ([Lynch, Craig, & Peng, 2011](#); [Turk & R Melzack, 2001](#)).

Pain patients frequently show signs of emotional distress, with evidence of depression, anxiety, and irritability. Individual and group therapy with a cognitive behavioral orientation is designed to help patients gain control of the emotional reactions associated with chronic pain. Specific problem-solving strategies can be offered during the therapy sessions, including 1) identifying maladaptive and negative thoughts, 2) disputing “irrational” thinking, 3) constructing and repeating positive self-statements, 4) learning distraction techniques, 5) working to prevent future “catastrophizing,” and 6) examining ways to increase social support.

Chronic pain significantly impacts all members of a family. Family members need to be educated about the goals of therapy and should have an opportunity to share their worries and concerns. Moreover,

active involvement of family members helps ensure the patient's long-term success. Therefore, both patients and members of their families should be invited to attend family therapy sessions. Besides enhanced communication, important outcomes of these sessions are that family members learn how to help the person in pain achieve and maintain goals and that they come to understand that they are not alone in their dealings with the person in pain. A series of studies by Keefe and colleagues at Duke University has revealed that systematically involving partners and spouses in non-pharmacologic treatment sessions (e.g., CBT, exercise) can amplify the benefits of those treatments by increasing social support, reducing distress, improving patients' use of pain-coping skills, etc ([Keefe & Somers, 2010](#)).

Psychologists frequently include relaxation training as an important part of their therapy with pain patients. Chronic pain patients tend to experience substantial residual muscle tension as a function of the bracing, posturing, and emotional arousal often associated with pain. Such responses, maintained over a long period, can exacerbate pain in injured areas of the body and increase muscular discomfort. For example, it is common for patients with low back pain or limb injuries to develop neck stiffness and tension-type headaches. Relaxation training can lead to pain reduction through the relaxation of tense muscle groups, the reduction of symptoms of anxiety, the use of distraction and the enhancement of self-efficacy. In addition, this training can increase the patient's sense of control over physiological responses. In a pain management program, patients are taught and encouraged to practice a variety of relaxation strategies, including diaphragmatic breathing, progressive muscle relaxation, autogenic relaxation, guided imagery and cue-controlled relaxation techniques. Hypnosis and biofeedback training are also commonly employed, and have been shown in numerous studies to reduce pain severity in a variety of chronic pain conditions. Recent work has begun to investigate the neurophysiological underpinnings of hypnosis, and functional neuroimaging studies suggest that it may help to "normalize" maladaptive pain processing in the central nervous system ([Jensen, Hakimian, Sherlin, & Fregni, 2008](#)).

One goal of treatment is the return of a patient with chronic pain to work. After an extended period out of work, patients become both physically and psychologically deconditioned to the demands and stresses of the workplace. Together with a therapist, the patient can develop a plan that incorporates both long-range employment goals and short-term objectives based on medical, psychological, social, and vocational information. Some assessment of aptitudes and interests, transferable skills, physical capacity, modifications in the workplace, skills training, and job readiness is needed to address realistic expectations and to optimize return-to-work options.

A psychologist should be comfortable discussing issues of deconditioning and the need to increase function. Most patients lose physical stamina and flexibility because of reluctance to exercise and a perceived need to protect themselves from additional physical injury. Some patients have been medically advised to restrict activity when pain increases. Patients with chronic pain need to know that exercise is important. Getting back to usual activities as soon as possible after an injury helps to prevent disability. Some stretching, cardiovascular activity, and weight training should be encouraged as medically indicated.

Psychiatric and Substance Abuse Issues

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Psychiatric comorbidity

Many chronic pain patients report feelings of depression, anxiety, irritability, and have a history of physical or sexual abuse, or a past history of a mood disorder ([Andersson, 1999](#); [Bair, Robinson, Katon, & Kroenke, 2003](#)). Close to fifty percent of patients with chronic pain have a comorbid psychiatric condition, and 35% of patients with chronic back and neck pain have a comorbid depression or anxiety disorder ([Katz, et al., 1997](#); [Katz, et al., 1999](#); [Peloso, et al., 2000](#)). In surveys of

chronic pain clinic populations, 50% to 80% of patients with chronic pain had signs of psychopathology, making this the most prevalent comorbidity in these patients ([Caldwell, et al., 1999](#); [Kalso, Edwards, Moore, & McQuay, 2004](#); [Maier, Hildebrandt, Klinger, Henrich-Eberl, & Lindena, 2002](#); [von Korff & Deyo, 2004](#)). Studies suggest that most patients with chronic pain present with some psychiatric symptoms.

One study conducted by Arkininstall and colleagues found a 50% prevalence of mood disorder in patients who were prescribed opioids, showing this to be a common diagnosis for chronic pain patients ([Arkininstall, et al., 1995](#)). Another study found that physicians are more likely to prescribe opioids for noncancer-related pain on the basis of increased affective distress and pain behavior, rather than the patient's pain severity or objective physical pathology. It has been found that patients who have chronic pain with psychopathology are more likely to report greater pain intensity, more pain-related disability, and a larger affective component to their pain than those who don't have evidence of psychopathology ([Breckenridge & Clark, 2003](#); [Moulin, et al., 1996](#)).

Patients with chronic pain and psychopathology, especially those with chronic low back pain, typically have poorer pain and disability outcome from treatments ([Rakvag, et al., 2005](#); [Rivest, Katz, Ferrante, & Jamison, 1998](#); [Rooks, et al., 2006](#); [Wasan, Kaptchuk, Davar, & Jamison, 2006](#)). In studies of patients with both chronic pain and anxiety and/or depression there was a significantly worse return to work rate one year after injury compared with those without any psychopathology ([Boersma & Linton, 2005](#); [Fishbain, 1999](#)). Patients who had chronic pain with low psychopathology had a 40% greater reduction in pain with IV morphine than those in a high-psychopathology group ([Gollub, et al., 2006](#)). It becomes apparent that patients with a high degree of negative affect benefit less from opioids in an attempt to try and control their pain.

Many patients with substance use disorders also have affective disorders. Attempting to manage a comorbid affective disorder may result in decreased substance abuse behaviors, although they may be at risk of relapse ([Brady, Myrick, & Sonne, 1998](#); [Cornelius, Salloum, & Ehler, 1997](#); [Kessler, McGonagle, & Zhao, 1994](#); [Sonne & Brady, 1999](#)). Hasin and colleagues found some patients abusing their pain medication as a way to alleviate their psychiatric symptoms ([Hasin, Liu, & Nunes, 2002](#)). From this finding and other reviews there is a strong suggestion that individuals with a mood disorder who self-medicate for negative affect are at increased risk for substance abuse ([Quello, Brady, & Sonne, 2005](#)). Since many patients with chronic pain frequently report mood swings and prominent anxiety and depression symptoms, it remains important to carefully monitor all patients for psychiatric comorbidity. This way, individuals who self-medicate with opioids for mood fluctuations have a greater chance to be identified.

Substance abuse assessment

The US Department of Justice has recommended efforts to improve identification of abuse and diversion of controlled substances by health care providers ([U.S. Department of Justice, 2006](#)). Physicians continue to struggle with providing the appropriate pain relief for patients, while minimizing the misuse of opioid analgesics ([Hampton, 2005](#)). Misuse of pain medications includes selling and diverting prescription drugs, seeking prescriptions from multiple providers, using illicit drugs, snorting or injecting medications, and using drugs in a manner other than the way it was intended.

There are a variety of assessment measures that can be used to help identify those patients who are prone to misuse their pain medications ([Robinson, et al., 2001](#)). Structured interview measures have been published for assessment of alcoholism and drug abuse based on DSM-IV criteria ([Helzer & Robins, 1988](#)), but these measures have not been validated in individuals with chronic pain. For example, some substance abuse measures, including the CAGE Questionnaire, Michigan Alcoholism

Screening Test, and Self-Administered Alcoholism Screening Test were initially designed for other patient populations ([Mayfield, Mcleod, & Hall, 1974](#); [Selzer, 1971](#); [Webster & Webster, 2005](#)). Using traditional substance abuse assessment tools may be beneficial for patients with a severe substance abuse disorder; however, these assessments may not be useful for individuals with chronic pain since there is a greater chance of a false positive with these measures. In general, there is a risk that medication abuse using traditional substance abuse measures will be identified based on reports of tolerance and dependence when no abuse exists.

The Screener and Opioid Assessment for Patients with Pain – Revised (SOAPP-R) is a 24-item self-administered screening tool developed and validated for those persons with chronic pain who are being considered for long-term opioid therapy. The SOAPP-R is designed to predict aberrant medication-related behaviors ([Butler, Budman, Fernandez, & Jamison, 2004](#); [Butler, Fernandez, Benoit, Budman, & Jamison, 2008](#)). This questionnaire includes subtle items that encourage the patient to admit to certain factors that are positively correlated with opioid misuse, yet outwardly are not perceived to lead to reprisals. This screening tool has been found to identify 90% of those who will eventually misuse opioids. The reliability and predictive validity of the SOAPP-R, as measured by the area under the curve (AUC), were found to be highly significant (test-retest reliability = .91; coefficient α = .86; AUC = .74) and were sufficiently similar to values found with the initial sample. A cut-off score of 18 revealed a sensitivity of .80 and specificity of .52. ([Butler, Budman, Fernandez K, Fanciullo, & Jamison, 2009](#)).

The Current Opioid Misuse Measure (COMM) is a 17-item questionnaire developed and validated for patients who have already been prescribed opioids for chronic pain ([Butler, et al., 2007](#)). The COMM helps to identify those patients who are currently misusing their prescribed opioid medication. The reliability and predictive validity, as measured by the area under the curve (AUC), were found to be highly significant (AUC = .81) with a reliability (coefficient α) of .83 ([Butler, et al., 2007](#)). Results of a cross validation suggest that the psychometric parameters of the COMM are not based solely on unique characteristics of the initial validation sample ([Butler, Budman, Fanciullo, & Jamison, 2010](#)). Both the SOAPP-R and COMM include subtle items that are correlated with opioid misuse and are items patients are willing to answer honestly.

Other validated measures have also been developed to screen patients with pain for addiction risk potential. The 5-item Opioid Risk Tool (ORT), a brief checklist completed by the clinician, is a validated questionnaire that predicts which patients will display aberrant drug-related behaviors ([Webster & Dove, 2007](#); [Webster & Webster, 2005](#)). Scores of 8 or higher suggest high risk for opioid medication abuse. A similar rating tool, The DIRE (standing for diagnosis, intractability, risk and efficacy), is a clinician-rating scale used to predict suitability for long-term opioid treatment for noncancer pain ([Belgrade, 2006](#)). Scores higher than 14 on the DIRE suggest a greater suitability of opioid therapy for patients with pain. The Pain Assessment and Documentation Tool is yet another scale completed by the clinician, which provides a detailed documentation of the patient's progress, which also helps to objectively record a patient's care ([Passik, et al., 2004](#); [Webster & Dove, 2007](#)). The Screening Instrument for Substance Abuse Potential (SISAP), is a self-report screening questionnaire for substance abuse potential based mostly on the alcohol literature ([Coombs, Jarry, Santhiapillai, Abrahamsohn, & Atance, 1996](#)). Unfortunately, this and other similar measures lack cross-validation studies. When using any tools to assess risk of opioid misuse, it is important to have background information about the patient.

It should be noted that scores of any clinical assessment tool used to determine abuse risk are not necessarily reason to deny opioids, but rather provides an estimate of the level of appropriate monitoring for the patient. Thus, although these clinical assessments are useful to estimate risk of noncompliant opioid use, the results are most useful to help determine how closely to monitor patients during opioid therapy.

Patients who are typically at a lower risk for misusing opioids include those who are older, generally compliant, have a record of rarely misusing any medication, show stable mood, are thoughtful and responsible, and generally have an easy-going personality. Risk factors for opioid misuse include 1) family or personal history of substance abuse, 2) young age, 3) history of criminal activity and/or legal problems (e.g. charged with driving under the influence, , 4) frequent contact with high-risk individuals or environments, 5) history of previous problems with employers, family, and friends, 6) history of risk-taking/thrill-seeking behavior, 7) smoking cigarettes, 8) history of severe depression or anxiety, 9) multiple psychosocial stressors, and 10) previous drug and/or alcohol rehabilitation. Patients prescribed opioids should be monitored regularly and should be examined for experiencing any adverse effects. Appropriate follow-up care should include repeated psychological evaluations.

Future Directions

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There is an important role for electronic pain assessment in future clinical practice. The scientific literature strongly suggests that electronic monitoring is better than traditional paper monitoring and that the technologies now are quite adaptable and will continue to improve into the future. Electronic tracking has been shown to outperform paper diaries ([Jamison, et al., 2002](#); [Jamison, et al., 2001](#)), but adoption remains the major hurdle for dissemination and the focus of future research should be on how to improve dissemination efforts.

Monitoring and self-assessment are key elements of patient care for persons with chronic pain. To be useful, these assessments need to be accessible, inexpensive, reliable, and easy to use. They also need to be acceptable for both the patients and providers alike. There has been much interest in electronic diaries that might meet the need of generating relevant medical information without unduly extending the time designated for the clinical visit. Research protocols have been designed to investigate whether innovative electronic pain assessment programs can save clinic time without compromising accuracy and completeness of the assessment. It has also been questioned whether electronic self-assessment software can be used to improve diagnoses and treatment decision making.

In the treatment realm, recent controlled trials demonstrate the capacity for complementary approaches such as Tai Chi and mindfulness meditation to reduce depression and other psychological symptoms among chronic pain patients ([Wang, et al., 2009](#); [Zautra, et al., 2008](#)), and further studies of such alternative medicine interventions is warranted. In addition, one noteworthy avenue of research involves modification of traditional exercise training interventions for chronic pain patients. Treatments such as graded exposure, which involve training patients to participate in feared physical activities (e.g., bending and lifting tasks for patients with back pain) are being applied with good success, especially in the context of rehabilitative treatment for chronic back pain. Psychologists have a prominent role to play in the development, dissemination, and implementation of such interventions. Moreover, outcomes studies suggest that graded exposure produces strong reductions in symptoms of distress and catastrophizing, and that these cognitive and emotional changes mediate the observed reductions in pain intensity and physical disability that the treatment produces ([Georges, Wittmer, Fillingim, & Robinson, 2010](#)). Indeed, it appears that changes in depression, distress, and catastrophizing may mediate many pain-treatment-related improvements, even for interventions that do not explicitly target cognitive and emotional factors ([Georges, et al., 2008](#); [Smeets, Vlaeyen, Kester, & Knottnerus, 2006](#)), which highlights the potential value of implementing psychosocial assessment of patient with chronic pain on a widespread basis. Eventually, it may be customary to collect information on patients' psychological status as a means of monitoring pain-treatment outcomes for a variety of analgesic interventions.

References

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