

Review

Philosophy and efficacy of multidisciplinary approach to chronic pain management

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Introduction

Epidemiological studies have indicated that over 40% of the general population experience persistent or recurrent pain [1,2]. Many of these individuals carry on their normal life activities without significant interruption; however, there are some whose lives are substantially compromised due to persistent pain problems. Adverse effects of chronic pain are frequently extended to the patient's family, affecting the well-being of family members [3–5]. Not only does chronic pain adversely affect quality of life, but it also has profound socioeconomic implications because chronic pain is frequently associated with loss of productivity as well as increased use of health care and welfare benefits.

Over the past three decades, intensive efforts have been made to identify the etiology, pathophysiology, and effective treatment of chronic pain. However, despite major advances in knowledge of sensory physiology, anatomy, and biochemistry and the development of new, potent medications and other innovative medical and surgical procedures, many chronic pain patients continue to suffer from unremitting pain and significant disability.

In recent years, the cost-effectiveness of therapies has become increasingly relevant in light of the limited health care resources. Consequently, critical evaluations of the empirical evidence for its efficacy are desired. The primary purpose of this paper is to review the efficacy of multidisciplinary treatment of chronic pain. Many multidisciplinary pain centers (MPCs) are available in the United States where chronic pain patients are treated by teams of clinicians with various health care backgrounds. We will first review the basic

philosophy of MPCs, including a historical overview of the conceptualization of pain. The specific clinical roles of physicians, nurses, physical and occupational therapists, and psychologists will also be discussed. Our review of the efficacy of MPC treatments will pay particular attention to the characteristics of patients and different areas on which the clinical evaluations of pain treatments should be based. Finally, we will discuss future directions of clinical practice in treating chronic pain disorders.

Conceptual models

Pain is a universal phenomenon. Because pain frequently follows an event associated with tissue damage, pain has been historically considered to have an isomorphic relationship with tissue pathology. This "somatogenic" model of pain has guided thinking and thus the way of assessing and treating pain. However, the relationship between physical findings and chronic pain is far from simple or linear. For example, a number of studies have reported that it is common to find radiographic abnormalities believed to be associated with pain in asymptomatic individuals [6–11]. Reports of pain severity can also differ across individuals, even when the level of physical pathology is comparable.

The pathophysiological bases for many chronic pain syndromes are illusive. For example, no pathology is identified in over 80% of patients with chronic back pain [12]. These findings raise questions regarding the validity of the somatogenic model. When the somatogenic model fails to explain the presence of unremitting pain, symptoms are often considered to be psychological in origin—"psychogenic." In this model, chronic pain is thought to be caused by a psychopathological disorder (i.e., hysteria, personality disorder or traits). Alternatively, motivation to gain financial and other benefits has been considered a primary mecha-

nism for complaints of chronic pain. No empirical support for either the psychogenic or the motivational models has been reported, yet these models continue to have a profound impact on how chronic pain patients are perceived and treated. Many patients report that stigmatization associated with the psychogenic and motivational models substantially adds to their suffering.

As an alternative way to conceptualize chronic pain, Fordyce [13] proposed that what patients do, rather than what they report about their pain, may be more helpful in understanding the persistence of chronic pain. A set of observable behaviors, termed "pain behaviors," such as verbal complaints, motor behaviors (e.g., liming, guarding), and help-seeking behaviors (e.g., medication intake) may serve as a means of communicating pain and distress to others. Fordyce's operant model of chronic pain is based upon the laws of learning in which observable behaviors can be reinforced or extinguished by environmental contingencies. The operant model should not be confused with the psychogenic-motivational model; the operant conditioning is not based upon maladaptive emotional factors or conscious motivation to receive reinforcement (so-called secondary gain).

Pain behaviors can be protective and appropriate for acute pain. However, if behaviors are reinforced, individuals may continue to exhibit those behaviors even after the pathology causing acute pain has been healed. Furthermore, avoidance pain behaviors, such as excessive resting, may lead to physical deconditioning, progressive muscle weakness, greater pain sensitivity, and disability. Research has supported the role that environmental contingency plays in influencing the occurrence of pain behaviors [14–16]. However, the presence of pain behaviors cannot be explained solely by operant conditioning [17,18], suggesting the need for a more comprehensive model.

The somatogenic, psychogenic, motivational, and operant models of pain assume that pain complaints are either totally physically based or totally psychologically based. They fail to consider pain as a complex perceptual experience. The definition of the International Association for the Study of Pain [19] recognizes that pain is a complex, multifactorial concept, stating that pain is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage." Pain is subjective and unique for each individual. A growing body of research has provided support for a multifactorial model of pain that consolidates complex interactions among physical, sensory, cognitive, affective, and behavioral factors [18,20].

Traditional interventions to treat chronic pain, such as analgesics, nerve blocks, and surgery, are based upon

the somatogenic model. However, failure to alleviate pain by exclusively somatically based techniques, as well as the emergence of the multifactorial conceptualization of pain, has been the impetus for the development of specialized pain treatment centers that include clinicians from various disciplines, known as multidisciplinary pain centers (MPCs). Dr. John Bonica [21], one of the earliest advocates of the MPC approach, has emphasized the importance of each member of the team contributing "his/her specialized knowledge and skills to the common goal of making the correct diagnosis and developing the most effective therapeutic strategies".

Definition of MPC

Since the first MPC was founded in the 1950s, the number of pain treatment facilities has grown rapidly, especially in North America, Western Europe, and Australia. By 1990, Bonica [21] estimated that there were approximately 1000 pain clinics in the United States alone and another 1000 facilities worldwide. A recent report [22] estimated that there were over 3000 facilities and solo pain treatment practitioners in the United States.

To minimize confusion, the International Association for the Study of Pain (IASP) [23] has defined four types of pain treatment facilities (Table 1). In this review, the term "MPC" is applied to both multidisciplinary pain clinics and centers described in Table 1.

Roles of primary specialties in the MPC approach

The concept of treating patients with multiple modalities and disciplines has been one of the most significant developments in the care of chronic pain patients. The implementation of a program may vary from structured inpatient programs to weekly outpatient therapy sessions. However, there are some common themes to all MPC programs, as summarized in Table 2.

Stieg and Turk [24] proposed a set of guidelines for the working relationships within an MPC team. The team members should share a multifactorial conceptualization of chronic pain and disability; synthesize the diverse sets of information from their own as well as consultants' evaluations into a differential diagnosis and treatment plan; work together to formulate and implement a comprehensive treatment plan; and act as a functional unit in which each member is willing to learn from the others and modify his or her opinions, when needed, according to the integrated observations and expertise of the entire group. Based upon these features, the roles of primary team members in a typical MPC environment in the Western health care system can be summarized as described below.

Table 1. Classification of pain centers**Multidisciplinary pain center**

An organization of health care professionals and basic scientists who conduct research and teaching and provide clinical care for both acute and chronic pain. These facilities are staffed by a wide array of health care professionals, including physicians, psychologists, nurses, physical therapists, and occupational therapists. Multiple therapeutic modalities are available in these facilities. These centers are usually affiliated with major health science institutions

Multidisciplinary pain clinic

A health care delivery facility staffed by a wide array of health care professionals, including physicians and other health service professionals who specialize in the diagnosis and management of patients with chronic pain. The multidisciplinary pain clinics are different from the multidisciplinary pain centers in that the former do not include research and educational activities in their regular programs

Pain clinic

A health care facility focusing upon diagnosis and treatment of chronic pain. A pain clinic may have specialization in specific diagnoses or pain related to a specific region, such as headaches. This term is not used for a solo practitioner

Modality-oriented clinic

A health care facility that offers a specific type of treatment and does not provide comprehensive assessment or management of pain. Examples include nerve block clinics and biofeedback clinics. There is no emphasis on an integrated, comprehensive interdisciplinary approach

Adapted from [23].

Table 2. General goals of MPCs

Diagnosis and treatment of any medical conditions associated with chronic pain
Elimination of inappropriate medications
Symptomatic improvement
Functional restoration (physical, social, and occupational)
Acquisition of adequate coping and cognitive skills
Facilitation of self-management
Reduction in future health care utilization

Physicians. Attending physicians in MPC programs typically specialize in pain medicine and have completed a pain fellowship. Medical issues, including, the diagnosis and management of anatomic, pathologic, and physiologic impairments related to pain, are the primary roles for physicians at MPCs. Physicians are expected to integrate all viewpoints of medical consultants and monitor all medications, cooccurring medical conditions, and any changes in the health status of patients.

Involvement of physicians in patient education is also common. For example, physicians may help patients

understand the philosophy underlying MPC treatment as rehabilitative rather than curative. Many chronic pain patients hold a belief that “My life will be just fine if only I can get rid of this pain.” Physicians need to communicate that the goal of MPCs is to treat the whole patient, not just the pain, and to help patients function and cope better despite the presence of persistent pain. Patients need to understand that the treatment is expected to reduce pain but not totally eliminate it. In addition to setting up patients’ expectations, educational sessions are designed to empower patients by encouraging them to abandon their role as passive recipients and to become active participants in their pain management regimen.

Although nerve blocks are commonly used to treat various forms of pain, many chronic pain patients report a relatively brief diminution in the intensity pain of following the procedure. In general, the literature indicates that the efficacy of nerve blocks in chronic, non-malignant pain is equivocal [25]. Given that functional capacities are not necessarily correlated with pain for many patients [26–28], nerve block can best be viewed as an adjunct to, rather than as an alternative to, general rehabilitation. The primary goal of nerve blocks in this context is not permanent reduction of pain but rather the production of brief symptomatic relief to facilitate the process of functional restoration, such as increased participation in physical exercises. When nerve blocks are used as a part of MPC treatment, it is important that patients do not develop a passive attitude toward the program (“They will cure my pain”). Active participation in the treatment (“I am going to manage my pain”) is a critical factor in the MPC approach.

Nurses. Nurses generally assume a wide range of responsibilities in the delivery of care at MPCs, including monitoring and evaluating patient history and current lifestyles, assisting in medication adjustment, and helping physicians during any procedural interventions. Nurses often lead group discussions to help patients adopt healthy lifestyles, particularly in the areas of diet, weight control, smoking, alcohol use, sexuality, and sleep hygiene. Faucett [29] also lists the main domains of care in assessment, patient education and advocacy, team facilitation, and case management.

Physical therapists. Since improvement in physical functioning is one of the primary goals of MPC treatment, physical therapists (PTs) assume an important role in rehabilitation. PTs perform comprehensive functional assessment, including examination of range of motion, postural and gait abnormalities, muscle strength, and reflexes.

Treatment generally consists of education and physical exercises. In the PT education sessions, patients

learn about the anatomical and physiological basis of pain and physical activity, body mechanics, self-management modalities for home use (e.g., heat, ice, and massage), and the rationale and nature of PT exercises (aerobic conditioning, muscle strengthening, and flexibility and endurance training). Graded fitness exercises are generally implemented, starting at submaximal physical ability and gradually increasing the level of exertion. This helps patients reduce their fear of exercise and reinjury and positively reinforces their efforts by ensuring initial success in meeting exercise goals. One of the essential components in successful PT treatment is adherence to the prescribed exercise regimen. PTs need to tailor progressive daily exercises that can easily be implemented in each patient's home environment.

Occupational therapists. Occupational therapists (OTs) focus on body mechanics, energy conservation in various activities, and job-related physical capacities. The work environment may be simulated to help patients resume specific functioning that is essential to their job or household activities. OTs often serve as liaisons between employers and injured workers and may recommend job modifications that will accommodate the patient's vocational capacities.

Psychologists. Attending psychologists generally have a doctoral degree in clinical psychology with advanced training in behavior medicine. Many have completed a clinical rotation during a predoctoral internship, followed by 1 to 3 years of a postdoctoral fellowship.

In the assessment, psychologists evaluate a wide range of psychosocial factors relevant to chronic pain, including prior and current psychosocial functioning, drug and alcohol abuse, mental health, coping, and interpersonal issues. The emphasis of the assessment is not on the role of psychological components as causal factors but rather on the impact of chronic disability on the patient's life and psychological health. Information from the assessment is integrated to determine the compatibility of patients with MPC treatment.

In the treatment, psychologists use various cognitive-behavioral techniques to help patients acquire adaptive attitudes and psychosocial skills. Details of specific psychological and cognitive-behavioral techniques are beyond the scope of this paper. Many handbooks on this topic are available [20,30–32]. The primary goal of the psychological intervention for an MPC treatment is to reinforce self-management of pain and stress. Much of the intervention is practical and direct and is generally problem-oriented, unlike traditional insight psychotherapy. Homework assignments and home rehearsals are viewed as essential to promote generalization of the skills acquired during sessions.

Efficacy of MPC treatment

Historically, the effectiveness of MPC treatment has been viewed with skepticism by some insurance companies and governmental agencies [33]. What may seem to be a simple question, "Are MPCs effective in treating chronic pain patients?" indeed, cannot be answered easily. Several factors need to be taken into consideration when evaluating the outcome of chronic pain treatment.

For whom are MPCs effective?

In many instances, referral to an MPC is considered the last resort after various treatment modalities have been tried without success. For example, based upon 3089 MPC patients, Flor et al. [34] reported that, on average, MPC patients had undergone 1.7 surgeries and approximately 85% were taking analgesic medications without sufficient symptomatic relief or functional restoration. Thus, patients who are treated at MPCs are not likely to be representative of all people with chronic pain. Indeed, epidemiological studies [35,36] reported that patients at MPCs could be distinguished from other chronic pain patients by the following characteristics: greater emotional distress, higher prevalence of work-related injury, greater health care utilization, constant pain, negative attitudes, higher prevalence of opioid intake, higher prevalence of previous surgery, and greater functional impairment. The estimated prevalence of depressive disorders is 50% for MPC patients [37] whereas depression can be diagnosed in only 6%–10% of patients seeking care at primary care clinics for their chronic pain [38]. Thus, overall, chronic pain patients who are referred to MPCs report elevated levels of psychosocial difficulties, multiple treatment failures, and significant functional impairment.

It is important to keep in mind that the evaluation of the efficacy of MPC treatment needs to be considered in light of the fact that patients whom MPCs serve have recalcitrant problems and are resistant to any treatment. These patients are at high risk for treatment failure. The treatment outcome of MPC approaches has to be measured against this backdrop.

Outcome criteria

Chronic pain, as noted earlier, is a multifactorial phenomenon. Thus, the evaluation of treatment effectiveness must be based upon several criteria: pain reduction, reduction or elimination of inappropriate medication, health care utilization, increase in functional ability, return to work, and closure of disability claims. The priority of these criteria depends upon who is asked to evaluate the treatment approach. For

example, the patients are most likely to be concerned about reduction of pain and suffering. Conversely, resumption of gainful employment may be most important to employers and workers' compensation boards, whereas for these groups pain reduction may be of relatively little importance. Finally, although efficacy can be inferred from changes over time from pretreatment to posttreatment, it is also important to consider the changes in a broader context of health care. In other words, the efficacy of MPCs should also be compared to that of other types of treatment that are commonly accepted for chronic pain, namely, surgical and conventional (pharmacological and biomedical) modalities.

Evaluation of MPC treatment

Pain reduction. Approximately 14%–60% reduction in pain severity has been reported at the end of treatment at MPCs [34,39,40]. Data from follow-up studies seem to indicate that pain reduction tends to be maintained up to 2 years [34]. It is, however, important to acknowledge that not all studies reported significant treatment effects in pain reduction. For example, Deardorff et al. [41] demonstrated significant pain reduction in both treated and untreated patients. Moreover, relapse in pain severity has also been reported [42].

Overall, a metaanalysis based upon 65 published outcome studies including a total of 3089 patients [34] suggests that pain reduction following treatment at MPCs is statistically significant. However, whether the changes (mean pain reduction = 25%) are clinically meaningful is less clear. Other types of treatment specifically designed to address pain reduction, however, do not seem to have any better outcome than treatments at MPCs. For example, approximately 70% of individuals who underwent lumbar surgery continued to complain of back pain several years following surgery, with 33% of these individuals reporting the presence of "heavy, constant pain" [43]. Lack of pain relief following surgery has also been reported by others [44–46]. One study reported that over two-thirds of patients undergoing lumbar fusion complained that pain was *worse* following surgery [47]. These results from postsurgery pain assessments suggest that although pain reduction following MPC treatment may not be impressive, it seems to be comparable to that following other interventions.

It should also be recalled that an average MPC patient has undergone 1.7 surgeries [34]. Furthermore, it is important to consider iatrogenic effects of treatments. Iatrogenic complications are common in surgical procedures for pain treatment. At times, additional surgery is required to correct iatrogenic problems due to the previous surgery [45]. On the other hand, iatrogenic complications are extremely rare in MPC treatment.

Management of inappropriate medications. The metaanalysis [34] reported that 85% of patients who were evaluated at MPCs were taking analgesic medications, with 50% receiving opioid medications. The long-term use of opioid medications to treat noncancer chronic pain has been controversial [48]. Physicians are commonly concerned about physical dependency and tolerance effect of opioids [49]. Misuse of and physical dependency (addiction) on hypnotics and sedatives are also common in chronic pain patients [50]. For a substantial number of physicians, elimination of inappropriate medications is a primary reason for referral to MPCs [51].

The high prevalence of use of analgesic, hypnotic, and sedative drugs among patients referred to MPCs suggests that these medications, at least for these patients, are not very effective in treating chronic pain. Furthermore, elimination or reduction of inappropriate medications is one of the important goals at MPCs, because the patient's belief that pain must be "cured" by medications is contradictory to the philosophy of MPCs to empower patients and let them take the initiative in their own care.

Generally, MPC treatment is effective in reducing inappropriate use of medication in chronic pain patients. For example, over 65% of patients who completed MPC treatment were opioid-free at 1 year follow-up [40]. Patients who undergo MPC treatment are substantially more likely to reduce opioid intake than patients receiving no treatment [52] or patients undergoing surgical procedures [34]. It is particularly telling that the reduction of medication intake is achieved even as pain complaints are reduced.

Health care utilization. Given the growing constraints on health care resources worldwide, whether a treatment has an impact on subsequent rates of health care use is of particular interest. Despite a commonly expressed assumption that MPCs are not a cost-efficient treatment option [53], research assessing the efficacy of MPCs indicates that MPCs reduce subsequent utilization of the health care system by chronic pain patients. MPC-treated patients are significantly less likely to have contact with various health care professionals and use less sick leave than conventionally treated patients [54–56]. Furthermore, up to 90% of MPC-treated patients have been reported to use no health care services for up to 1 year following the treatment [40,57,58].

A number of studies have demonstrated that MPC-treated patients subsequently undergo fewer surgeries and fewer hospitalizations (Fig. 1) [52,55,59,60] than conventionally treated patients. On average, 17% of MPC-treated and 47% of conventionally treated patients are hospitalized, and 10% of MPC-treated and 28% of conventionally treated patients undergo surgical

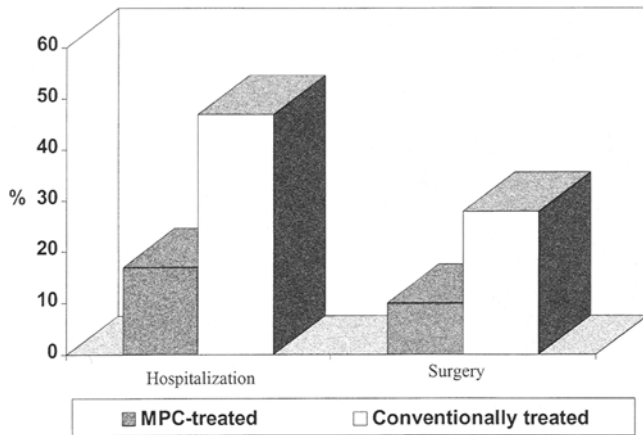


Fig. 1. Hospitalization and surgery following MPC and conventional treatments

intervention following their respective treatments. A substantial minority of surgically treated patients may require repeated surgery because of lack of efficacy and additional surgery to correct iatrogenic complications [45,61,62]. Based on these results, Turk and Okifuji [63] estimated lifetime savings of over \$240 million (US) in surgical and other medical costs for a hypothetical cohort of 7140 patients treated annually at MPCs in the United States.

Functional restoration. Functional impairment is a major problem in chronic pain patients. Yet research evaluating surgical and pharmacological treatments for chronic pain has rarely measured functional ability as an outcome factor. The improvement in functioning is considered a driving factor in the MPC approach. Even if treatment does not eliminate pain totally, restoring function provides patients with an opportunity to resume productive lives, thereby improving quality of life.

The results of the metaanalysis [34] indicate that MPCs are successful in restoring functional ability. An increase in physical activity of approximately 65% was observed following MPC treatment. In contrast, only a 35% increase was reported in patients receiving conventional (unimodal) medical care.

Return to work. Resumption of gainful employment is a major concern in the care of chronic pain patients, especially those whose pain began following work-related injury. It is worth noting that return to work is not a function simply of clinical variables related to chronic pain. Various socioeconomic factors, including local economic growth, job market, marketability of the patient's occupational skills, and financial incentives of a job, all affect the likelihood that a chronic pain patient

Table 3. Comparisons between MPC and conventional treatment in the proportion of patients returning to work following treatment

Study	% Returning to work	
	MPC	Conventional treatment
Roberts and Reinhardt 1980 [66]	77	5
Sturgis et al. 1984 [67]	29	14
Guck et al. 1985 [68]	75	25
Finlayson et al. 1986 [69]	65	44
Duckro et al. 1985 [70]	71	33
Mayer et al. 1987 [55]	87	41
Tollison et al. 1989 [60]	56	27
Hazard et al. 1989 [71]	81	29
Deardorff et al. 1991 [41]	48	0
Tollison 1991 [52]	57	20
Sachs et al. 1990 [72]	63	42
Peters et al. 1992 [73]	38	8
Burke et al. 1994 [74]	62	30
Bendix et al. 1996 [56]	52	15
Average	61	21

will return to work. Flor et al. [34] reported that an average MPC patient has been unemployed for 7 years. Patients are now 7 years older than when they were working, and their skills that were adequate 7 years ago may not be highly desirable in the current job market. A history of back injury—one of the most common presenting complaints in MPCs—may also work against individuals whose jobs require physically demanding skills. We must ask whether MPCs help patients return to work against such odds.

Research evaluating MPC treatment generally reports that many chronic pain patients are able to return to work following the completion of treatment [64,65]. When compared with conventionally treated patients, MPC-treated patients are substantially more likely to resume working. The results of 14 studies addressing return to work are summarized in Table 3. On the average, the rate of return to work for MPC-treated patients is 61%, whereas the rate for conventionally treated patients is 21%. Flor et al. [34] reported comparable rates from their metaanalysis. When patients undergo surgical intervention, the rates remain around 20%–25% [75,76]. Thus, MPCs seem to have substantially greater success in returning workers to gainful employment, despite the recalcitrant nature of their pain problems.

Disability welfare benefit. Many individuals with chronic pain problems find it difficult to maintain employment and start relying upon disability benefits from the welfare system. A recent report [77] estimated that up

to \$43 billion is spent annually in the United States for disability awards for back pain alone. Similarly to the return-to-work criterion, whether MPC treatment leads to the closure of disability claims has become an important outcome because of the socioeconomic implications of reduced productivity, wage loss, and disability payments.

A substantial number of MPC-treated patients seem to close disability claims after completing the treatment. The proportion of patients receiving disability payments is significantly reduced (70%–45%) [78]. For example, approximately 75% of the cases are recommended for closure [79], and the majority of litigation is settled within a year [80,81]. The efficacy of conventional and surgical interventions for closing disability claims is not known at this time.

A cautionary note is worth mentioning about the implications of the findings on claim closures. The decision as to whether a claim should be closed is essentially administrative, rather than medical. In the ideal situation, the decision, although administrative, should be based upon objective signs and symptoms. However, claim closure for chronic pain patients must, given the subjective nature of the syndrome, depend upon the patients' self-report of pain and disability. The complex nature of chronic pain disorders inevitably makes the extent and quality of the claim adjusters very important. Nonetheless, very little is known about the reliability of decision making by case managers on closing disability claims. In addition, societal and organizational pressures to promote closure may also become relevant as financial resources become more constricted. Therefore, careful interpretation is needed to understand disability closure as a treatment outcome in pain therapy.

Future directions

Issues of service delivery

MPC treatment can be delivered in different formats. Earlier attempts to treat chronic pain patients at MPCs generally took place in an inpatient setting, where patients participated in various therapeutic sessions for 4 to 8 weeks. A recent trend, however, is to provide service in an outpatient setting. Many programs are offered in the 3- to 4-week, intensive day program format, in which patients spend 6 to 8 h in therapy each weekday. Research comparing the efficacy of inpatient and outpatient services has yielded inconsistent results, with some indicating superior improvement in functional status in inpatient settings [82–84] but others showing little difference [85,86].

Less intensive rehabilitation programs are also available. Weekly therapy sessions (such as half a day per

week) over several months have been found effective for treating some pain problems [87,88]. Home-based programs also seem to be less expensive yet have been reported to be effective [89,90]. Efficacy, costs, labor hours, and availability of resources all have to be taken into consideration in determining the mode of MPC treatment.

Heterogeneity of chronic pain patients

It is generally assumed that chronic pain patients are a homogeneous group. Aside from the primary pain locations (e.g., back), patients with noncancer chronic pain are often regarded as one group sharing common features and mechanisms. It is possible that confusion and inconsistency in many research findings result from this assumption. In other words, we may be treating a group of heterogeneous individuals as a single entity—a patient uniformity myth. In light of the socioeconomic constraints, we need to start thinking that there may be subsets of patients who require different types of MPC treatment. Matching patients' clinical needs and treatment modalities may improve the clinical efficacy and cost-effectiveness of pain treatments.

Past research has demonstrated that chronic pain patients can be classified into subgroups based upon psychosocial characteristics [91–93]. Recent studies suggest that these subgroups respond differently to different treatments [28,94,95]. These results suggest that since MPC treatment generally includes a wide range of components, combinations of MPC components may be packaged differently to match patient characteristics. Thus, future research should ask not whether MPCs are effective, but what treatments should be delivered to patients, in what way, and with what characteristics [96].

Prevention

Because of the adverse impact of chronic pain on patients' lives and on society as a whole, interest in preventive intervention has been growing in recent years. Prevention may be primary, in which attempts are made to prevent initial injury that may become chronically troublesome, or secondary, involving early intervention at the time of the initial injury. Recent reviews [97,98] have pointed out that evaluations of single modalities, such as education, exercise, ergonomics, and risk factor (e.g., smoking) modification, have yielded inconsistent results in preventing back pain. These modalities, however, may work better in combination. There is some evidence that some combinations of exercise and educational programs may help reduce wage losses and medical costs [99]; however, the contributions of multidisciplinary work to prevention of chronic pain are not well understood at this time. Since a history of back

pain is one of the predictors of future back problems [100], MPCs may be able to develop secondary prevention programs. Such programs would not be as intense as the rehabilitative programs described above. The preventive programs might incorporate education, body mechanics, exercise, and psychosocial interventions, particularly regarding modifications of risk factors, with a strong focus on returning to usual activities as quickly as possible. Prospective studies are needed to evaluate the efficacy of MPCs in the prevention of disability associated with chronic pain.

Concluding comments

Given the growing constraints on health care resources, accountability and evidence-based treatment outcomes have become particularly important in determining the choice of treatment. Despite the common misperception that no evidence exists to support the efficacy of MPCs, more data are available for the evaluation of MPC treatments than for any of the conventional or surgical interventions for chronic pain. Indeed, MPC treatments are probably the most rigorously tested modalities in the area of chronic pain [101].

Since various biopsychosocial factors are involved in chronic pain, such as physical conditioning, operant, respondent, and social learning, and emotional and cognitive factors, it seems reasonable to conclude that interactions among clinicians with expertise from various disciplines are most helpful. Reflecting this philosophical stance, outcome evaluations of MPC treatment generally provide empirical support for their efficacy.

In contrast, conventional and surgical interventions tend to focus solely on pain severity as an index of clinical improvement for chronic pain. The difference is, again, philosophical. MPCs intend to treat chronic pain patients, not just pain. That is, whereas the conventional and surgical interventions may regard chronic pain as exclusively a physical pathology, thus targeting pain, MPCs are likely to consider chronic pain as a syndrome with a set of diverse physical, functional, and psychological problems. To reiterate, MPC treatments focus upon rehabilitation instead of cure. There is sufficient evidence, as described earlier, that no treatment is universally successful in "curing" pain in chronic pain patients. However, outcome studies of MPC treatments described in this paper strongly suggest that treatments can assist disabled persons to become relatively functional individuals with improved quality of life.

From the practice point of view, although the multifactorial definition of pain [9] has been widely accepted, the transition of clinical practice from unimodal treatments of chronic pain to MPCs is not, unfortunately,

simple. Many physicians, especially when clinicians in the other disciplines are not available, are compelled to become a "multidisciplinary team" by themselves. It is unrealistic to ask a single physician to have a detailed understanding of psychology, PT, OT, and nursing at sufficient levels to complete a comprehensive assessment and treatment of chronic pain. Nor does it appear to be a cost-effective practice. Whereas the consultation-liaison model of practice may have to be adopted in the absence of clinical resources, we must strive to help not only patients but also clinicians and administrators (e.g., in hospitals, insurance companies, and medical school departments in which PTs, OTs, psychologists, and nurses are trained) understand the needs and rationale for developing MPCs.

MPCs offer promising treatments for chronic pain patients. Among all the modalities for treating chronic pain, the most rigorous empirical testing has been conducted on MPC approaches [101]. MPCs have been shown to be more cost-effective than surgical and conventional medical interventions [63]. The empirical evidence is delineated despite the fact that MPCs are the treatment of last resort. Early referrals and preventive work may also help patients resume their functional activities without prolonging their problems. It seems reasonable, therefore, to conclude that MPCs offer the most vital clinical options for those who suffer from chronic, disabling pain problems.

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