
Interdisciplinary Chronic Pain Management

Past, Present, and Future

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Chronic pain is a significant and costly problem in the United States as well as throughout the industrialized world. Unfortunately, there have been concerns about the effectiveness of traditional medical interventions, suggesting the need for alternative chronic pain treatment strategies. However, the introduction of the biopsychosocial model of pain during the past decade stimulated the development of more therapeutically effective and cost-effective interdisciplinary chronic pain management programs. In the present article we briefly review the history of pain management, discuss the major components of a “true” interdisciplinary pain management program, focus on the evidence-based outcomes that have documented the effectiveness of such interdisciplinary pain management programs, and note the barriers that have blocked the wider use of such programs. Finally, we discuss future directions in interdisciplinary pain management.

Keywords: chronic pain, interdisciplinary care, cognitive-behavioral therapy, functional restoration, biopsychosocial model

Pain affects millions of Americans; contributes greatly to national rates of morbidity, mortality, and disability; and is rising in prevalence. Substantial disparities exist in the prevalence, seriousness, and adequate treatment of pain that affect the vulnerable populations of traditional public health concern. Pain exacts enormous costs both economically and in the toll it takes on people’s lives. Analysis performed for the committee revealed that the annual economic cost of chronic pain in the United States is at least \$560–635 billion. This estimate combines the incremental cost of health care (\$261–300 billion) and the cost of lost productivity (\$297–336 billion) attributable to pain. The federal Medicare program bears fully one-fourth of U.S. medical expenditures for pain; in 2008, this amounted to at least \$65.3 billion, or 14 percent of all Medicare costs. In total, federal and state programs—including Medicare, Medicaid, the Department of Veterans Affairs, TRICARE, workers’ compensation, and others—paid out \$99 billion in 2008 in medical expenditures attributable to pain. Lost tax revenues due to productivity losses compound that expense. (Institute of Medicine, 2011, p. 5)

The above quote is from the recently released report *Relieving Pain in America*, by the U.S. Institute of Medicine, which highlights the emotional and economic toll of chronic pain. Prevalence estimates of chronic pain in the United States vary widely, with recent estimates ranging between 30% and 40% of the adult U.S. population

(Johannes, Le, Zhou, Johnston, & Dworkin, 2010; Tsang et al., 2008). It has been reported that approximately 100 million adult Americans suffer from chronic pain, a total greater than the number of individuals with diabetes, heart disease, and cancer combined (Centers for Disease Control and Prevention, 2002; U.S. Department of Health and Human Services, 2006).

Chronic pain is clearly a major health care problem in the United States, and its significance will only continue to grow with the “graying of America.” Currently, there are approximately 35 million Americans age 65 years or older, accounting for 12.4% of the total population (U.S. Census Bureau, 2001). By the year 2030, it is projected that about 20% of the population will be 65 years of age or older (U.S. Census Bureau, 2000). The Institute of Medicine (2011) indicated that although pain prevalence estimates vary for older adults, chronic pain severity and related disability do seem to increase with age. Thus, the aging of the Baby Boomer population is going to result in a rapid increase in chronic pain problems, accompanied by a similar rise in individual and societal pain management costs. Now, more than ever, it is vital to identify the most cost-effective ways to manage chronic pain.

“Typical” biomedical interventions for chronic pain (e.g., opioid medication, surgery) may lack long-term benefit or subject the pain patient to risks that obviate the need for an alternative approach. There has been some dispute about the benefits of opioids medication for chronic pain conditions (e.g., low back pain; Chou, 2013). Deyo and colleagues (2011) found that over 60% of patients with noncancer pain were prescribed opioids, and almost 20% were categorized as “long-term” users. After reviewing electronic records for over 26,000 pain patients, these in-

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investigators ultimately determined that longer term use of opioids was associated with increased psychological distress and health care utilization. Opioid medications also present a significant risk for misuse (Potter & Marino, 2013). Although they can be helpful with short-term use, opioids' benefit declines as their use persists (Krashin, Sullivan, & Ballantyne, 2013), and persistent use may ultimately lead to opioid-induced hyperalgesia (Brush, 2012). Growing concerns about narcotics misuse and abuse have prompted calls for improved oversight of opioid prescription practices throughout the United States (Bloodworth, 2006; Gourlay, Heit, & Almahrezi, 2005). Indeed, the Centers for Disease Control and Prevention (2011) reported that oxycodone-related deaths in the State of Florida rose 265% between 2003 and 2009. This negative press has contributed to state government regulations designed to curtail the operations of "pill mill" clinics (which tout themselves as multidisciplinary but offer little intervention other than prescriptions for opioids) as well as damage to the general reputation of organized pain care.

Surgical interventions for chronic pain can be equally concerning. Some studies have shown an increase in surgical interventions for chronic pain. For example, Rajaei, Bae, Kanim, and Delamarter (2012) found a 137% increase in spinal fusion surgery for low back pain between 1998 and 2008 and an 11.8% increase in laminectomy procedures. However, there are concerns about high disability rates after these procedures (Tarnanen et al., 2012). Clearly, an alternative approach for chronic pain management is sorely needed to help improve long-term outcomes.

Fortunately, the biopsychosocial model of pain and disability is now widely accepted as the most heuristic approach to the understanding and treatment of chronic pain disorders, replacing the outdated biomedical reduc-

tionist model (Gatchel & Okifuji, 2006; Gatchel, Peng, Peters, Fuchs, & Turk, 2007; Turk & Monarch, 2002). The biopsychosocial approach describes pain and disability as a complex and dynamic interaction among physiological, psychological, and social factors that perpetuate, and even worsen, one another, resulting in chronic and complex pain syndromes. As the biopsychosocial model evolved and began to spread through the scientific and medical communities, it became increasingly apparent that trying to manage chronic pain through biological pathways alone was a "dead end" (Gatchel et al., 2007). This new approach offered valuable additional avenues for pain management that have diversified the cadre of treatment providers capable of managing chronic pain, and has led to breakthrough clinical approaches with significantly better outcomes.

There is no simple isomorphic relationship between nociception/pathology and pain. Pain is widely regarded as a complex phenomenon with inputs from biological nociceptive and hypothalamic-pituitary-adrenal axis activity, as well as psychosocial and socioeconomic factors such as emotional disposition, cognition and attention, functional and subjective disability, and system-of-care issues. Even the biological processes contributing to pain have roots in psychosocial processes including both emotions and cognition. Emotion is the more immediate reaction to nociception, while cognitions attach meaning to the emotional experience of pain. These pain-related cognitions can trigger additional emotional and behavioral reactions that amplify the experience of pain and perpetuate a vicious cycle of nociception, pain, distress, and disability. Wright and Gatchel (2002) explained that this process is likely to occur when a chronic pain sufferer adopts a "sick role" whereby the pain sufferer increasingly focuses on his or her pain and related disability while abdicating or relinquishing social and occupational responsibilities to others. Fortunately, with the biopsychosocial model in mind, some very effective comprehensive interdisciplinary pain treatment programs have been developed to address this complex interaction process.

To start, a clear distinction needs to be made between *multidisciplinary* versus *interdisciplinary* pain management. There is often confusion in the literature regarding the differences between multidisciplinary and interdisciplinary pain management, resulting in the terms being used interchangeably. *Multidisciplinary* connotes the involvement of several health care providers (physician, psychologist, physical therapist, occupational therapist). However, the integration of their services, as well as communication among providers, may be limited because these individuals may not be located in the same facility. Even when various treatment providers are co-located, they may still be considered as providing multidisciplinary care if they pursue treatments with separate goals that do not take into account the contributions of other disciplines. *Interdisciplinary* care consists of greater coordination of services in a comprehensive program and frequent communication among health care professionals, all providing care "under one roof" at the same facility. The key ingredients for interdis-



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ciplinary care are a common philosophy of rehabilitation, constant daily communication among on-site health care professionals, and active patient involvement. A truly integrated pain management program ensures the best patient care by emphasizing the regular coordination of services. Therefore, there *must* be constant communication among all treatment team members, and the team members need to ingrain the treatment philosophy in their patients to ensure effective comprehensive treatment. Even though these two terms are often used interchangeably in the scientific and clinical literature, it is important for the reader to be aware of the clear distinction between them. In the present article we discuss evidence-based outcomes demonstrating the treatment- and cost-effectiveness of interdisciplinary pain management as well as why there has been a shocking decrease in the number of interdisciplinary pain treatment programs during the past decade.

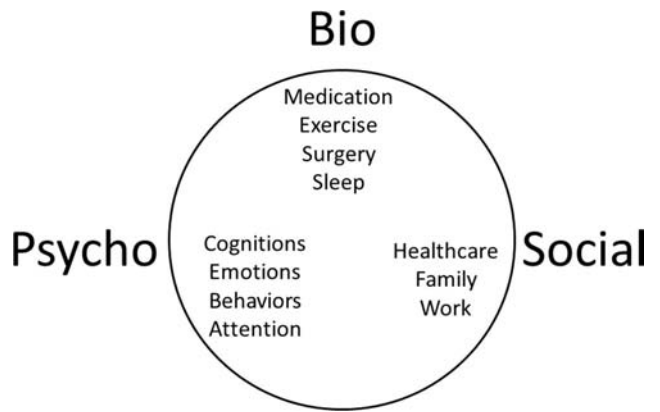
Historical Overview

Formal pain management interventions have been around for thousands of years, with examples on record for various ancient civilizations including China (acupuncture), Egypt (opium), India (emotional intervention), Greece (balance of humors), and the Romans (who were one of the first civilizations to recognize the importance of the nervous system in pain; El Ansary, Steigerwald & Esser, 2003; Shealy & Cady, 2002a). According to Shealy and Cady (2002a), early interventions were guided by belief systems ascribing various origins for pain experience (the heart, the brain, the nerves, religious concerns) that resulted in pain interventions such as trephination and exorcism. Eventually, scientific advancements improved our understanding of pain generators and gave rise to medicinal treatments for pain, starting with substances such as opium and alcohol. These

advances ultimately led to the development of formal pain medications, beginning with nitrous oxide, which signaled the beginning of formal medical pain management (Mel-drum, 2003). Melzack and Wall (1965) broadened the scope of services contributing to pain management with the publication of their gate control theory of pain in 1965, and Wilbert “Bill” Fordyce’s work on behavioral pain management interventions solidified the importance of psychosocial and physical therapy interventions for chronic pain management (Fordyce, 1976; Shealy & Cady, 2002b). All of this culminated in a biopsychosocial model of interdisciplinary care, incorporating physical treatment with cognitive, behavioral, environmental, and emotional interventions (see Figure 1).

Chronic pain rehabilitation programs first appeared in the United States in the 1970s and, in many accounts, are credited to John Bonica, who was one of the first to propose organized pain services in the 1940s (Bonica, 1977). After witnessing the significant pain management needs of combat-injured World War II soldiers, Bonica expressed concern that individuals struggling with chronic pain were unable to find timely access to specialized pain care (Bonica, 1977; Wells & Miles, 1991). Wall (2000) reported that early pain sufferers were forced, due to the absence of organized pain clinic services, to simply guess the possible causes of their pain and to hope they could find a specialist who would provide appropriate care. This resulted in significant “doctor shopping” and high care costs as pain sufferers blindly sought adequate treatment for pain conditions that were not well understood by most physical medicine providers. Bonica posited that patients would benefit from a care model in which multiple pain specialty services were centralized in one location, making them easier to find. Although he attempted to establish a multidisciplinary pain clinic in the 1960s, Bonica was overwhelmed by the difficulty of organizing a pain clinic

Figure 1
The Biopsychosocial Model of Pain Emphasizes the Dynamic Interaction Among Physiological, Psychological, and Social Factors



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around limited treatment options. It was not until he became aware of the multidisciplinary pain service established by Bill Fordyce and John Loeser at the University of Washington's Hospital Department of Physical Medicine and Rehabilitation that Bonica truly embraced the pain clinic model he helped invent (Meldrum, 2007). Interestingly, Fordyce and Loeser's pain service, though the first of its kind, offered pain management strategies using a philosophy that is considered cutting-edge today. For example, Fordyce eschewed the notion of simply addressing pain complaints and developed a model of gradually increasing exercise that underpins the clinical success of modern functional restoration treatments (Meldrum, 2007). Despite this early success, however, the growth of pain clinics was slow, due largely to factors that contribute to pain clinic failure today: inadequate funding to support the initial high costs of establishing an interdisciplinary clinic; lack of sufficient time to train and organize clinic staff; and the absence of a unifying model of pain care that serves as a roadmap for fully integrating the various pain clinic services (Runy, 2007; Wells & Miles, 1991).

In the late 1980s, there was some debate over how to formally define an interdisciplinary pain clinic, making it difficult to provide uniformed guidelines for optimal pain clinic set-up. Eventually, the International Association for the Study of Pain (IASP), a worldwide organization of pain clinicians and researchers, assembled a task force to quell the debate and develop unified guidelines for the field. The IASP task force recommended that interdisciplinary pain centers offer a diversity of health care providers with sufficient professional breadth to comprehensively address the biopsychosocial model of pain (Task Force on Guidelines for Desirable Characteristics for Pain Treatment Facilities, 1990).

They suggested that staffing should include at least two physicians (and/or a psychiatrist), as well as a clinical psychologist, a physical therapist, and additional health care providers (if needed) to address the particular needs of specific pain populations served by the center. The task force guidelines also included a requirement for regular meetings among the care providers organized by a center director. They recommended that assessment and treatment options be comprehensive and include physical medicine services (e.g., physical exams, medication management), psychosocial services (e.g., biopsychosocial evaluation and cognitive-behavioral treatment), physical and occupational therapy services (e.g., manual therapies and functional restoration through guided exercise), and referrals for any additional specialty care not offered by the interdisciplinary team. Table 1 provides a brief review of the roles of each team member.

The new millennium brought with it a new emphasis on the problem of chronic pain and an urgency to the quest to improve our ability to manage it effectively. In October 2000, the 106th U.S. Congress designated the years 2000 through 2010 as the "Decade of Pain Control and Research," elevating pain as a priority of American public health and increasing pain research, intervention, and education resources nationwide (Hamdy, 2001; Lippe, 2000; Nelson, 2003). At the same time, the Joint Commission on Accreditation of Healthcare Organizations began to formally encourage health care systems and providers to track pain as "the fifth vital sign" as a means of enhancing pain care and overcoming barriers to pain management associated with underassessment (Lynch, 2001). The Department of Veterans Affairs (VA) also launched the National Pain Management Strategy in 1998, designed to improve pain care and research in the VA health system (Kerns, 2012). Many agree that these developments greatly enhanced awareness of pain as a vital health care issue, and the accompanying research advanced our understanding of chronic pain mechanisms and improved treatment pathways (Elvir-Lazo & White, 2010; Raja & Jensen, 2010). However, there is evidence to suggest that at least some of the aims of the Decade of Pain Control and Research fell short. For example, Bradshaw and colleagues (2008) aptly pointed out that between 2003 and 2007, funding for pain research through the National Institutes of Health (which were specifically encouraged to *increase* their pain research in the National Pain Care Policy Act of 2003) actually *decreased* by 9.4% annually. This decrease was found to be disproportionate to changes in National Institutes of Health (NIH) budgets, with pain research representing less than 1% of the NIH budget between 2004 and 2007.

The Decade of Pain Control and Research was accompanied by a number of legislative attempts to increase resources for pain management research and training and to improve education and access to care for pain patients (Congressional Budget Office, 2008; Nelson, 2003). Although early iterations of the National Pain



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Care Policy Act died in committee in 2003 and 2008 (<http://www.govtrack.us/congress/bills/110/s3387>), the 2009 Act was received by the Senate and recommended to the House Committee on Health, Education, Labor, and Pensions as H.R. 756 (<http://thomas.loc.gov/cgi-bin/bdquery/z?d111:H.R.756>). However, H.R. 756 did not make it back to the Senate and was not signed into law either (<http://www.opencongress.org/bill/111-h756/show>). Perhaps the best opportunity for a legislative stimulus to advance pain management intervention and research lies with the passing of the Patient Protection and Affordable Care Act (2010; ACA), which offers specific provisions for improving education, research, and management of chronic pain conditions (Tabak, 2012). In his testimony before the U.S. Senate Committee on Health, Education, Labor, and Pensions in February 2012, the principal deputy director of NIH, Dr. Lawrence A. Tabak, explained the various ACA mandates for improving pain care in the United States. Notably, Section 4305 of the ACA requires the establishment of the Interagency Pain Research Coordinating Committee (which summarizes available research on chronic pain and identifies relevant research gaps); a Conference on Pain in collaboration with the Institute of Medicine (which was charged to evaluate the adequacy of chronic pain assessment and management and to identify barriers to care); and funding for education and training programs in pain care (Section 759, subsection (b)(3) specifically emphasizes encouraging interdisciplinary programs for pain management delivered through “specialized centers”). In fact, the ACA is likely not only to foster specialty services (i.e., through interdisciplinary specialty centers) for pain but also to contribute to changes in how chronic conditions (such as pain) are addressed in primary care (Jacobson & Jazowski, 2011). It is hoped that legislation like the ACA will help promote research and development on interdisciplinary models of chronic pain management.

Treatment- and Cost-Effectiveness of Interdisciplinary Pain Management Programs

The treatment- and cost-effectiveness of interdisciplinary pain management programs have been well documented in the scientific literature (e.g., Gatchel & Okifuji, 2006; Turk & Swanson, 2007). For example, in their evidence-based clinical practice guidelines, Chou and colleagues (2009) rated the use of interdisciplinary treatment for low back pain as a “strong” recommendation associated with a “high” quality of evidence. With these strong endorsements in mind, coupled with the fact that there has been considerable additional clinical research in recent years (after the Gatchel & Okifuji, 2006, and Turk & Swanson, 2007, reviews) that has overwhelmingly supported the validity of this approach, it is worth evaluating the current state of interdisciplinary chronic pain management in greater detail. For example, Oslund et al. (2009) explored the long-term effectiveness of interdisciplinary pain management programs and found that patients reported improved outcomes across a range of domains (pain severity, interference of pain with function, etc.) and that these gains were maintained at one-year follow-up. Also, Scascighini, Toma, Dober-Spielmann, and Sprott (2008) determined that interdisciplinary pain programs outperformed standard medical pain services and less coordinated “multidisciplinary” programs. For chronic low back pain, Weiner and Nordin (2010) found that interdisciplinary care demonstrated greater overall effectiveness than numerous other common pain management interventions, including medication and cognitive-behavioral therapy. Clearly, the integrated combination of medical, psychosocial, and physical rehabilitation implicit in interdisciplinary pain management results in a comprehensive treatment strategy that ushers in a more advanced stage of chronic pain management than traditional medical treatment alone. The result is that other effective treatment modalities (e.g., cognitive-behavioral therapy) may be synergistically integrated into a collective effort geared toward patient wellness. There is ample evidence to suggest that interdisciplinary pain programs offer not only the best clinical care for pain sufferers but also the most cost-effective long-term treatment option. For example, Rodríguez and García (2007) found that although the mean monthly treatment cost of chronic pain was similar for patients treated in both primary care and pain clinics, the comprehensive pain clinic patients reported significantly fewer emergency room visits, primary care visits, and medication use for pain management. Ektor-Andersen, Ingvarsson, Kullendorf, and Obraek (2008) found that pain sufferers who received a team-based cognitive-behavioral treatment (CBT) program took significantly fewer sick days from work than those who received primary care treatment, with almost half as many CBT patients on medical leave one year posttreatment. Furthermore, selecting the most cost-effective therapies (instead of the cheapest) contributes not only to long-term cost savings but also to vast improvements in health-related quality of life for the patient (O’Connor, 2009). Early referral for

Table 1
Health Care Professionals and Their Roles in an Interdisciplinary Chronic Pain Management Program

Health care professional	Role
Physician	<ul style="list-style-type: none"> • Serves as medical director of interdisciplinary treatment team • Assumes direct role of medical management for the patient • Coordinates patient's medical treatment provided by other health care professionals • Provides constant and effective communication among all treatment personnel • Attends formal interdisciplinary treatment team meetings to review patient's progress • Evaluates and monitors treatment outcomes
Nurse	<ul style="list-style-type: none"> • Assists physician • Provides follow-up for all procedures (injections, nerve blocks, etc.) • May interact as patient's case manager • Maintains effective communication with treatment team • Attends formal interdisciplinary treatment team meetings to review patient's progress • Evaluates and monitors treatment outcomes
Psychologist	<ul style="list-style-type: none"> • Provides full psychosocial evaluation • Assess patient's psychological strengths and weaknesses • Uses cognitive-behavioral treatment approach to psychosocial issues • Maintains effective communication with treatment team • Attends formal interdisciplinary treatment team meetings to review patient's progress • Evaluates and monitors treatment outcomes
Physical therapist	<ul style="list-style-type: none"> • Educates on the physiological bases of pain • Teaches appropriate body mechanics and pacing • Maintains effective communication with treatment team • Attends formal interdisciplinary treatment team meetings to review patient's progress • Evaluates and monitors treatment outcomes
Occupational therapist	<ul style="list-style-type: none"> • Addresses vocational issues and physical determinants of disability • Teaches pain techniques for managing pain on the job • Contacts employers to obtain job description/offer job retraining • Maintains effective communication with treatment team • Attends formal interdisciplinary treatment team meetings to review patient's progress • Evaluates and monitors treatment outcomes

interdisciplinary pain management is highly recommended based on evidence suggesting that the first year of chronic pain experience is often the most costly (Kronborg, Handberg, & Axelsen, 2009).

One of the difficulties with the use of specialty pain centers (such as interdisciplinary chronic pain management programs) is that they can be short term even though the pain management needs of the patient continue long term. Because of this discrepancy, increasing attention is being paid to the role of the primary care "home" provider in interdisciplinary care. Rothman and Wagner (2003) offered an excellent overview of the home provider's role in the management of chronic illness, especially after the patient has been referred for specialty care. They noted that the best long-term treatment outcomes arise when care is shared between specialty centers and the patient's home provider. Thus, instead of a patient departing primary care entirely for specialty intervention, both teams should work

in unison to maximize benefit. These authors also stated that behavioral health providers can enhance chronic illness care in the patient-centered medical home by improving motivation and treatment adherence in primary care patients.

The Role of Cognitive Behavioral Therapy in Interdisciplinary Pain

A central feature of interdisciplinary treatment for chronic pain is the use of CBT. The central aims of CBT are to identify and replace maladaptive patient cognitions, emotions, and behaviors with more adaptive ones in the hopes of maximizing the benefit of other interdisciplinary care components (e.g., physical therapy) and increasing functional capacity through improved coping. Within interdisciplinary chronic pain management programs, CBT has emerged as the psychosocial treatment of choice for

chronic pain. In their meta-analysis, Morley, Eccleston, and Williams (1999) found that CBT interventions promoted significant improvements in multiple psychosocial dimensions of chronic pain (e.g., coping, pain behavior, social functioning). Specific examples of cognitive areas addressed by CBT include catastrophizing, acceptance of the pain condition, avoidance of activity due to unrealistic concerns about harm (i.e., fear avoidance, kinesiophobia), and expectations of pain treatment (Vowles, McCracken, & Eccleston, 2007). Additional CBT methods include relaxation training, attention control, motivation (i.e., motivational interviewing), and activity management training (i.e., pacing). CBT is often short term and skill oriented, two valuable aspects with regard to treatment of chronic pain patients in the context of these intensive and relatively brief programs.

McCracken and Turk (2002) reported numerous controlled clinical trials of CBT in interdisciplinary chronic pain intervention contexts and found these treatments to be successful at helping patients manage their chronic pain conditions. Additionally, a review by Gatchel and Rollings (2008) offered further support regarding the efficacy of CBT intervention in chronic pain. Gatchel and Robinson (2003) also provided a comprehensive overview for CBT intervention with chronic pain populations based on the extensive support for the use of CBT found in the literature. Group CBT psychotherapy has also been widely identified and recommended as an important treatment for persistent pain conditions (e.g., Keefe, Rumble, Scipio, Giordano, & Perri, 2004; Morley et al., 1999).

With current evidence-based clinical research overwhelmingly supportive of the use of interdisciplinary chronic pain management, clinicians should familiarize themselves with the various facets that comprise this approach. Providers must be aware that communication and collaboration among team members is a requisite element of effective interdisciplinary treatment. Essentially, the sum of the collective medical, psychological, and physical rehabilitation processes represents an improved treatment option compared with the worth of these processes as isolated treatments. The extensive and ever-growing literature in support of interdisciplinary treatment approaches for chronic pain reflects a collective affirmation for superior patient care.

Functional Restoration

Functional restoration (FR), the first evidence-based form of interdisciplinary pain management for chronic pain disorders, was initially developed in 1988 by Mayer and Gatchel (1988). Since that time, FR has consistently demonstrated significant improvements in the diagnosis, intervention, and management of chronic pain compared with other approaches (Gatchel & Mayer, 2008). FR requires an interdisciplinary team of clinicians who coalesce treatment around goals of restoring physical functional capacity and psychosocial performance. This comprehensive approach also requires excellent communication among providers in order to address physical, psychological, and vocational

challenges during patient recovery. Numerous studies across different economic and social conditions have consistently demonstrated significant outcomes associated with FR, including international studies completed in Denmark (A. F. Bendix et al., 1996; T. Bendix & Bendix, 1994), Germany (Hildebrandt, Pfingsten, Saur, & Jansen, 1997), Canada (Corey, Koepfler, Etlin, & Day, 1996), France (Jousset et al., 2004), and Japan (Shirado et al., 2005). Thus, Gatchel and Okifuji (2006) concluded that the comparable outcomes of FR across cultures and workers' compensation systems are testament to the robustness of FR treatment effects. Moreover, the success of the FR approach has been thoroughly documented, with over 40 studies now available through MEDLINE that support the approach and with dissemination worldwide, including into the U.S. military.

Implementing Interdisciplinary Pain Management: Examples of Successful U.S. Pain Programs

Stanos (2012) offered an excellent overview of four notable interdisciplinary pain programs across the United States: the Mayo Clinic Rehabilitation Center (Rochester, MN); the Brooks Pain Rehabilitation Program (Jacksonville, FL); the Rehabilitation Institute of Chicago Center for Pain Management (Chicago, IL); and the Cleveland Clinic Foundation, Chronic Pain Rehabilitation Program (Cleveland, OH). Each of these programs represents an interdisciplinary specialty center (often based on an FR model) offering care consistent with the level of specialty pain care encouraged by the ACA. As Stanos described, these programs offer intensive and integrated rehabilitation lasting six to eight hours per day for three to six weeks, all with excellent short- and long-term physical, psychosocial, and socioeconomic outcomes. In fact, these programs have been so successful in civilian settings that recent attempts have been made to integrate interdisciplinary FR pain programs into more specialized, at-risk care environments such as the Department of Defense.

Musculoskeletal pain disorders are of significant concern in the U.S. Armed Forces. This is particularly true considering the physical requirements placed on many military personnel and the high-risk environments in which they work. The incidence of chronic pain in the military will likely increase due to the unique nature of the conflicts in Iraq and Afghanistan. Improvised explosive devices and advanced body armor have shifted wounding patterns away from mortal thoracic and head wounds toward survivable extremity and spinal trauma, leaving hundreds of thousands of soldiers alive but in pain (Belmont, Goodman, et al., 2010; Belmont, Schoenfeld, & Goodman, 2010). In recognition of this problem, the U.S. House of Representatives drafted H.R. 5465, the Military Pain Care Act of 2008, which identified pain as a prevalent and significant problem for the U.S. military and encouraged broad changes in how chronic pain is managed (however, it was not enacted; see <http://www.govtrack.us/congress/bills/110/hr5465>). Recently, both the U.S. Army and the U.S. Air

Force have implemented FR pain clinics based on a model developed through a Department of Defense–funded research initiative that began in 2003, the Functional Occupational Restoration Treatment (FORT) program. FORT was designed to decrease chronic pain, increase functioning, and retain military members on active duty using an interdisciplinary FR model tailored to the unique context of pain in the military.

Data analyses to date have shown a variety of desirable outcomes associated with FORT treatment (Gatchel et al., 2009). The FORT intervention resulted in significant improvements for functional capacity, health-related quality of life, and military retention, while the treatment-as-usual group showed no significant change in physical or psychosocial outcomes over the one-year assessment span. Furthermore, participants who completed treatment as usual were *three times* more likely than FORT participants to receive a medical discharge from active duty service and were also more likely to seek increased levels of pain-related health care and medication use. The success of this research project proved the efficacy of the interdisciplinary FR approach even when translated into a military medical environment. More work is needed, however, to examine the cost-effectiveness of this military approach.

Why Interdisciplinary Pain Management Programs Have Been Allowed to Financially Fail

In a 2007 interview, Dr. Michael Clark (clinical director of the Chronic Pain Management Program at the James A. Haley Veterans Hospital in Florida) noted, “Pain management programs are notorious for appearing and disappearing. It’s not good for the patient and it’s not good for the institution” (quoted in Runy, 2007, p. 45). There are numerous barriers to the more widespread use of interdisciplinary pain centers. First, despite the global recognition of the importance of developing an interdisciplinary team, there is some inconsistency in how pain programs manifest interdisciplinary practice. Consistent with what we reviewed earlier, definitions of “interdisciplinary” and “multidisciplinary” treatment vary throughout the extant research literature, making it difficult to offer uniform guidance for pain practice (despite the IASP task force guidance intended to unify the field’s definitions for these terms). For example, Collett, Cordle, and Stewart (2000) provided definitions of “interdisciplinary” and “multidisciplinary” treatment that were the opposite of the IASP definitions. They described “interdisciplinary” treatment as characterized by individual providers who refer challenging cases to consultants (care defined by the IASP task force as “multidisciplinary”) and “multidisciplinary” treatment as involving a team of co-located treatment providers treating the pain sufferer as a team (care defined by the IASP task force as “interdisciplinary”). Again, clarity in the definition of interdisciplinary treatment is vital to treatment effectiveness, because multidisciplinary treatment (as described in the IASP definition) actually detracts from treatment effectiveness. Additionally, Thunberg and Hallberg

(2002) suggested that the loose professional associations that characterize IASP multidisciplinary pain management programs may contribute to widely variable treatment outcomes as a result of poorly defined clinical procedures, lack of a common clinical orientation, and poor communication that can contribute to inadequate patient care. Truly *interdisciplinary* programs offer significantly better treatment through

- organized leadership that imparts a centralized vision for care integration;
- dynamic treatment informed by the care and assessment of other providers designed to help the patient maximally benefit from all aspects of care (e.g., a psychologist may help the patient overcome catastrophic concerns about pain to improve engagement in physical therapy); and
- a team focus on common goals developed in collaboration with the patient (the ultimate goal of returning to work, improved physical function resulting in increased family activities, etc.).

As reviewed earlier, the cost-effectiveness of interdisciplinary pain programs has been well documented (e.g., Gatchel & Okifuji, 2006; Turk & Swanson, 2007), but there is still some reluctance on behalf of third-party payers to compensate for such comprehensive care (Clark, 2009; Manchikanti, Singh, & Boswell, 2010). Interdisciplinary treatment is obviously a superior treatment choice when treatment costs are considered in the context of health care costs associated with incomplete or standard (i.e., noninterdisciplinary) pain treatment. Gilron and Johnson (2010) examined a subset of STOP-PAIN participants (an initiative undertaken by the Canadian STOP-PAIN Research Group examining the impact of pain care wait times) and found that median standard care costs for pain management services amounted to over \$17,000 per patient per year. Gatchel and Okifuji (2006) found that medication costs for pain management in the absence of any additional care have been estimated to cost up to \$21,500 per year, with similar costs generated for some pain management surgeries. Furthermore, Cunningham, Rome, Kerkvliet, and Townsend (2009) reported significant reductions in medication use associated with successful interdisciplinary treatment, resulting in daily savings of \$6–\$10 per day attributable to reduced medication use alone. Interdisciplinary treatment has been shown to contribute to significant decreases in medication use, health care utilization, and surgeries, with the potential to save tens of thousands of dollars in direct care outcomes and hundreds of thousands of dollars in indirect costs associated with long-term disability.

Finally, the key major barrier to the wider authorization and use of interdisciplinary pain management programs has been third-party insurance payers, who refuse to cover such programs as a means of cost containment. As initially highlighted by Gatchel and Okifuji (2006), these third-party payers have lacked an understanding of such programs and have remained unenlightened about the long-

term cost savings of such programs relative to traditional, outdated pain treatment approaches. These payers view such comprehensive programs as too costly “up front,” without realizing that costs will be saved in the long run. Moreover, as a means of cutting costs, managed care organizations have been “carving out” portions of the integrated comprehensive programs by sending patients to outside providers for their various needs (because they have contracted with such providers, who cost them less) even though such providers do not have an understanding of true interdisciplinary care. This fragmented care dilutes the successful outcomes of integrated programs (Gatchel et al., 2001; Keel et al., 1998; Robbins et al., 2003).

The result of such imprudent cost-cutting efforts has been the gradual demise of effective interdisciplinary pain management programs. As highlighted by Schatman (2007), the number of such accredited programs in the United States has steadily declined from a high of 210 in 1998 to 84 in 2005, and the number is continuing to drop because insurance companies, owing to their misguided cost concerns, will not authorize patients for entry into such programs. In fact, a 2011 review of accredited outpatient interdisciplinary programs (as listed by CARF International, a worldwide accreditor of health and human service providers, originally known as the Commission on Accreditation of Rehabilitation Facilities) revealed that there are now only 58 accredited pain programs in the United States. This has created a serious bioethical issue because, in attempts to cut treatment costs, chronic pain patients are being denied treatment in effective, evidence-based interdisciplinary pain management programs (which are being driven out of business because of a lack of patients authorized to use them). Obviously, this ill-advised strategy has gone awry because, as we noted at the beginning of this article, the Institute of Medicine (2011) has clearly pointed out the economic and human toll created by the ineffective treatment of chronic pain in our current health care system in the United States.

The Future of Interdisciplinary Pain Management

Much has changed in the landscape of pain management over the past decade. Despite a number of field improvements including enhanced understanding of neurological pain mechanisms and a stronger appreciation for interdisciplinary care programs with focused CBT components, there are still notable gaps in the research that are likely to affect psychologists involved in pain management. One of the most widely agreed-upon gaps in pain research is a general lack of effective pain care options for Americans suffering from chronic pain. There is currently widespread recognition that chronic pain is grossly undertreated due to myriad barriers, including access to specialty services, poverty and ethnic/racial disparities in pain care, lack of insurance, language barriers, and a relative lack of specialty medical services in rural areas (Giordano & Schatman, 2008; Meghani et al., 2012). Although some of these barriers may be overcome through improvements in health

care coverage associated with the ACA, others will require ongoing advancements in pain management. Perhaps one of the most notable efforts in overcoming access to chronic pain care lies in expanding chronic pain management competencies among primary care providers. Every single primary care provider surveyed in one study reported managing some patients with chronic pain, most often through the prescription of opioid medications (Vijayaraghavan, Penko, Guzman, Miaskowski, & Kushel, 2012). Unfortunately, surveys of patients receiving pain care in primary care settings have revealed that most pain patients feel undertreated by their primary care providers (Upshur, Bacigalupe, & Luckmann, 2010). Efforts are underway to bridge the primary care gap through telehealth-based consultation like that offered through the University of New Mexico Health Science Center's Project ECHO and through the development of evidence-based clinical practice guidelines for primary care providers treating chronic pain conditions (Koes et al., 2010). Though still somewhat controversial, telehealth technologies are increasingly being explored to connect chronic pain patients to specialty services that they otherwise might not be able to afford or reach (cf. Kroenke, 2012; McGeary, McGeary, & Gatchel, 2012; McGeary, McGeary, Gatchel, Allison, & Hersh, 2013).

Much more work is needed to translate excellent scientific findings for psychology-aided interdisciplinary pain interventions into sustainable community programs. Although part of this work will involve finding ways to navigate managed care to make interdisciplinary pain care more cost efficient, there is some promise for transdisciplinary programs in which a few providers take on the skillsets of multiple specialties (Gordon et al., 2013). The application of personalized medicine principles (based on comprehensive assessment, extant research findings, or even genomics/proteomics) may guide providers toward more effective use of available treatment options (Bruehl et al., 2013). Additionally, there is increasing recognition of the complexities of chronic pain management for patients presenting with psychosocial comorbidities (some of which significantly impact response to traditional pain interventions; McGeary, Moore, Vriend, Peterson, & Gatchel, 2011). All of these topics represent the next frontier of pain management facing psychologists.

Summary and Conclusions

Chronic pain is a significant and costly problem in the United States and throughout the industrialized world. Although significant progress has been made in identifying the best treatment approaches, there are still major obstacles to progress that must be addressed before the true benefits of these treatments are realized. There are data available that support the cost-effectiveness of interdisciplinary treatments for chronic pain conditions. However, few have published comprehensive reviews of direct and indirect cost benefits. Making this information readily available should not only bolster the development of reliable and valid pain programs but should also pave the way

for improved third-party reimbursement that will allow the new programs to stay afloat. The IASP definition of interdisciplinary pain care has greatly benefited the field by providing a blueprint for establishing the best models of pain clinics. However, there still seems to be some confusion within the profession about how to define and develop a truly interdisciplinary pain care model. Creating an interdisciplinary service can be quite difficult compared with the ease of simply co-locating multiple services within one clinic. Once established, however, these interdisciplinary programs greatly enhance the effectiveness of treatment for the chronic pain sufferer and create a rewarding and profitable experience for the chronic pain provider. We hope that this article will add to the existing calls for improved pain clinic models, and we strongly urge the rest of the interdisciplinary chronic pain community to join in the fight to promote the best possible chronic pain care. Our patients and their families certainly deserve it!

REFERENCES

- Belmont, P. J., Goodman, G. P., Zacchilli, M., Posner, M., Evans, C., & Owens, B. D. (2010). Incidence and epidemiology of combat injuries sustained during "the Surge" portion of Operation Iraqi Freedom by a U.S. Army brigade combat team. *Journal of Trauma*, *68*, 204–210. doi:10.1097/TA.0b013e3181bdcf95
- Belmont, P. J., Schoenfeld, A. J., & Goodman, G. (2010). Epidemiology of combat wounds in Operation Iraqi Freedom and Operation Enduring Freedom: Orthopaedic burden of disease. *Journal of Orthopaedic Advances*, *19*, 2–7.
- Bendix, A. F., Bendix, T., Vægter, K., Lund, C., Frølund, L., & Holm, L. (1996). Multidisciplinary intensive treatment for chronic low back pain: A randomized, prospective study. *Cleveland Clinic Journal of Medicine*, *63*(1), 62–69. doi:10.3949/ccjm.63.1.62
- Bendix, T., & Bendix, A. (1994). *Different training programs for chronic low back pain—A randomized, blinded one-year follow-up study*. Paper presented at the International Society for the Study of the Lumbar Spine, Seattle, WA.
- Bloodworth, D. (2006). Opioids in the treatment of chronic pain: Legal framework and therapeutic indications and limitations. *Physical Medicine and Rehabilitation Clinics of North America*, *17*, 355–379. doi:10.1016/j.pmr.2005.12.001
- Bonica, J. J. (1977). Basic principles in managing chronic pain. *Archives of Surgery*, *112*, 783–788. doi:10.1001/archsurg.1977.01370060115017
- Bradshaw, D. H., Empy, C., Davis, P., Lipschitz, D., Dalton, P., Nakamura, Y., & Chapman, C. R. (2008). Trends in funding for research on pain: A report on the National Institutes of Health grant awards over the years 2003 to 2007. *The Journal of Pain*, *9*, 1077–1087. doi:10.1016/j.jpain.2008.09.008
- Bruehl, S., Apkarian, A. V., Ballantyne, J. C., Berger, A., Borsook, D., Chen, W. G., . . . Lin, Y. (2013). Personalized medicine and opioid analgesic prescribing for chronic pain: Opportunities and challenges. *The Journal of Pain*, *14*, 103–113. doi:10.1016/j.jpain.2012.10.016
- Brush, D. E. (2012). Complications of long-term opioid therapy for management of chronic pain: The paradox of opioid-induced hyperalgesia. *Journal of Medical Toxicology*, *8*, 387–392. doi:10.1007/s13181-012-0260-0
- Centers for Disease Control and Prevention. (2002). *CDC injury fact book 2001–2002*. Atlanta, GA: Author.
- Centers for Disease Control and Prevention. (2011). Drug overdose deaths—Florida, 2003–2009. *Morbidity and Mortality Weekly Report*, *60*, 869–872.
- Chou, R. (2013). Steering patients to relief from chronic low back pain: Opioids' role. *Journal of Family Practice*, *62*(3, Suppl.), S8–S13.
- Chou, R., Loeser, J. D., Owens, D. K., Rosenquist, R. W., Atlas, S. J., Baisden, J., . . . American Pain Society Low Back Pain Guideline Panel. (2009). Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: An evidence-based clinical practice guideline from the American Pain Society. *Spine*, *34*(10), 1066–1077. doi:10.1097/BRS.0b013e3181a1390d
- Clark, M. E. (2009). Cost-effectiveness of multidisciplinary pain treatment: Are we there yet? *Pain Medicine*, *10*, 778–779. doi:10.1111/j.1526-4637.2009.00659.x
- Collett, B.-J., Cordle, C., & Stewart, C. (2000). Setting up a multidisciplinary clinic. *Bailliere's Clinical Obstetrics and Gynaecology*, *14*, 541–556. doi:10.1053/beog.1999.0090
- Congressional Budget Office. (2008). [Cost estimate for H. R. 2994, the National Pain Care Policy Act of 2008, prepared for the U.S. Congress]. In *110th Congress, House of Representatives, Report 110-871* (pp. 7–9). Retrieved from <http://www.gpo.gov/fdsys/pkg/CRPT-110hrpt871/pdf/CRPT-110hrpt871.pdf>
- Corey, D. T., Koepfler, L. E., Etlin, D., & Day, H. I. (1996). A limited functional restoration program for injured workers: A randomized trial. *Journal of Occupational Rehabilitation*, *6*, 239–249. doi:10.1007/BF02110886
- Cunningham, J. L., Rome, J. D., Kerkvliet, J. L., & Townsend, C. O. (2009). Reduction in medication costs for patients with chronic nonmalignant pain completing a pain rehabilitation program: A prospective analysis of admission, discharge, and 6-month follow-up medication costs. *Pain Medicine*, *10*, 787–796. doi:10.1111/j.1526-4637.2009.00582.x
- Deyo, R. A., Smith, D. H., Johnson, E. S., Donovan, M., Tillotson, C. J., Yang, X., . . . Dobscha, S. K. (2011). Opioids for back pain patients: Primary care prescribing patterns and use of services. *Journal of the American Board of Family Medicine*, *24*, 717–727. doi:10.3122/jabfm.2011.06.100232
- Ektor-Andersen, J., Ingvarsson, E., Kullendorf, M., & Oebraek, P. (2008). High cost-benefit of early team-based biomedical and cognitive-behaviour intervention for long-term pain-related sickness absence. *Journal of Rehabilitation Medicine*, *40*, 1–8. doi:10.2340/16501977-0127
- El Ansary, M., Steigerwald, I., & Esser, S. (2003). Egypt: Over 5000 years of pain management—Cultural and historic aspects. *Pain Practice*, *3*, 84–87. doi:10.1046/j.1533-2500.2003.00010.x
- Elvir-Lazo, O. L., & White, P. F. (2010). The role of multimodal analgesia in pain management after ambulatory surgery. *Current Opinion in Anesthesiology*, *23*, 697–703. doi:10.1097/ACO.0b013e32833fad0a
- Fordyce, W. (1976). *Behavioral methods of control of chronic pain and illness*. St. Louis, MO: Mosby.
- Gatchel, R. J., & Mayer, T. G. (2008). Evidence-based review of the effectiveness of functional restoration for the management of chronic low back pain. *The Spine Journal*, *8*, 65–69. doi:10.1016/j.spinee.2007.10.012
- Gatchel, R. J., McGeary, D. D., Peterson, A. L., Moore, M. E., LeRoy, K., Isler, W. C., . . . Edell, T. (2009). Preliminary findings of a randomized controlled trial of an interdisciplinary functional restoration program. *Military Medicine*, *174*, 270–277.
- Gatchel, R. J., Noe, C., Gajraj, N., Vakharia, A., Polatin, P. B., Deschner, M., & Pulliam, C. (2001). The negative impact on an interdisciplinary pain management program of insurance "treatment carve out" practices. *Journal of Workers Compensation*, *10*, 50–63.
- Gatchel, R. J., & Okifuji, A. (2006). Evidence-based scientific data documenting the treatment and cost-effectiveness of comprehensive pain programs for chronic nonmalignant pain. *The Journal of Pain*, *7*(11), 779–793. doi:10.1016/j.jpain.2006.08.005
- Gatchel, R. J., Peng, Y., Peters, M. L., Fuchs, P. N., & Turk, D. C. (2007). The biopsychosocial approach to chronic pain: Scientific advances and future directions. *Psychological Bulletin*, *133*, 581–624. doi:10.1037/0033-2909.133.4.581
- Gatchel, R. J., & Robinson, R. C. (2003). Pain management. In W. O'Donohue, J. E. Fisher, & S. C. Hayes (Eds.), *Cognitive behavior therapy: Applying empirically supported techniques in your practice* (pp. 273–279). New York, NY: Wiley.
- Gatchel, R. J., & Rollings, K. H. (2008). Evidence-based review of the efficacy of cognitive-behavioral therapy for the treatment of chronic low back pain. *The Spine Journal*, *8*, 40–44. doi:10.1016/j.spinee.2007.10.007
- Gilron, I., & Johnson, A. P. (2010). Economics of chronic pain: How can science guide health policy? *Canadian Journal of Anesthesia*, *57*, 530–538. doi:10.1007/s12630-010-9307-3

- Giordano, J., & Schatman, M. E. (2008). An ethical analysis of crisis in chronic pain care: Facts, issues, and problems in pain medicine; Part I. *Pain Physician, 11*, 483–490.
- Gordon, R. M., Corcoran, J. R., Bartley-Daniele, P., Sklenar, D., Sutton, P. R., & Cartwright, F. (2013). A transdisciplinary team approach to pain management in inpatient health care settings. *Pain Management Nursing*. Advance online publication. doi:10.1016/j.pmn.2013.01.004
- Gourlay, D. L., Heit, H. A., & Almahrezi, A. (2005). Universal pain precautions in pain medicine: A rational approach to the treatment of chronic pain. *Pain Medicine, 6*, 107–112. doi:10.1111/j.1526-4637.2005.05031.x
- Hamdy, R. C. (2001). The decade of pain control and research. *Southern Medical Journal, 94*, 753–754. doi:10.1097/00007611-200108000-00001
- Hildebrandt, J., Pflugsten, M., Saur, P., & Jansen, J. (1997). Prediction of success from a multidisciplinary treatment program for chronic low back pain. *Spine, 22*, 990–1001. doi:10.1097/00007632-199705010-00011
- Institute of Medicine. (2011). *Relieving pain in America: A blueprint for transforming prevention, care, education, and research*. Washington, DC: National Academies Press.
- Jacobson, P. D., & Jazowski, S. A. (2011). Physicians, the Affordable Care Act, and primary care: Disruptive change or business as usual? *Journal of General Internal Medicine, 26*, 934–937. doi:10.1007/s11606-011-1695-8
- Johannes, C. B., Le, T. K., Zhou, X., Johnston, J. A., & Dworkin, R. H. (2010). The prevalence of chronic pain in United States adults: Results of an internet-based survey. *The Journal of Pain, 11*, 1230–1239. doi:10.1016/j.jpain.2010.07.002
- Jousset, N., Fanello, S., Bontoux, L., Dubus, V., Billabert, C., Vielle, B., . . . Richard, I. (2004). Effects of functional restoration versus 3 hours per week physical therapy: A randomized controlled study. *Spine, 29*(5), 487–493. doi:10.1097/01.BRS.0000102320.35490.43
- Keefe, F. J., Rumble, M. E., Scipio, C. D., Giordano, L. A., & Perri, L. M. (2004). Psychological aspects of persistent pain: Current state of the science. *The Journal of Pain, 5*, 195–211. doi:10.1016/j.jpain.2004.02.576
- Keel, P. J., Wittig, R., Deutschman, R., Diethelm, U., Knüsel, O., Löschmann, C., . . . Spring, H. (1998). Effectiveness of in-patient rehabilitation for sub-chronic and chronic low back pain by a integrative group treatment program. *Scandinavian Journal of Rehabilitation Medicine, 30*, 211–219. doi:10.1080/003655098443959
- Kerns, R. D. (2012, August). Transforming pain management services for veterans. *Health Services Research & Development Service Forum*, 1–2; 8. Retrieved from http://www.hsrd.research.va.gov/publications/internal/forum08_12.pdf
- Koes, B. W., van Tulder, M., Lin, C. W. C., Macedo, L. G., McAuley, J., & Maher, C. (2010). An updated overview of clinical guidelines for the management of non-specific low back pain in primary care. *European Spine Journal, 19*, 2075–2094. doi:10.1007/s00586-010-1502-y
- Krashin, D., Sullivan, M., & Ballantyne, J. (2013). What are we treating with chronic opioid therapy? *Current Rheumatology Reports, 15*, 311. doi:10.1007/s11926-012-0311-1
- Kroenke, K. (2012). Calling all patients: Telehealth has arrived. *Pain Practice, 12*, 502–505. doi:10.1111/j.1533-2500.2012.00588.x
- Kronborg, C., Handberg, G., & Axelsen, F. (2009). Health care costs, work productivity and activity impairment in non-malignant chronic pain patients. *European Journal of Health Economics, 10*(1), 5–13. doi:10.1007/s10198-008-0096-3
- Lippe, P. M. (2000). The Decade of Pain Control and Research. *Pain Medicine, 1*, 286. doi:10.1046/j.1526-4637.2000.00050.x
- Lynch, M. (2001). Pain as the fifth vital sign. *Journal of Intravenous Nursing, 24*, 85–94.
- Manchikanti, L., Singh, V., & Boswell, M. V. (2010). Interventional pain management at crossroads: The perfect storm brewing for a new decade of challenges. *Pain Physician, 13*, E111–E140.
- Mayer, T. G., & Gatchel, R. J. (1988). *Functional restoration for spinal disorders: The sports medicine approach*. Philadelphia, PA: Lea & Febiger.
- McCracken, L. M., & Turk, D. C. (2002). Behavioral and cognitive-behavioral treatment for chronic pain: Outcome, predictors of outcome, and treatment. *Spine, 27*, 2564–2573. doi:10.1097/00007632-200211150-00033
- McGeary, D. D., McGeary, C. A., & Gatchel, R. J. (2012). A comprehensive review of telehealth for pain management: Where we are and the way ahead. *Pain Practice, 12*, 570–577. doi:10.1111/j.1533-2500.2012.00534.x
- McGeary, D. D., McGeary, C. A., Gatchel, R. J., Allison, S., & Herish, A. (2013). Assessment of research quality of telehealth trials in pain management: A meta-analysis. *Pain Practice, 13*, 422–431. doi:10.1111/j.1533-2500.2012.00601.x
- McGeary, D., Moore, M., Vriend, C. A., Peterson, A. L., & Gatchel, R. J. (2011). The evaluation and treatment of comorbid pain and PTSD in a military setting: An overview. *Journal of Clinical Psychology in Medical Settings, 18*, 155–163. doi:10.1007/s10880-011-9236-5
- Meghani, S. H., Polomano, R. C., Tait, R. C., Vallerand, A. H., Anderson, K. O., & Gallagher, R. M. (2012). Advancing a national agenda to eliminate disparities in pain care: Directions for health policy, education, practice, and research. *Pain Medicine, 13*, 5–28. doi:10.1111/j.1526-4637.2011.01289.x
- Meldrum, M. L. (2003). A capsule history of pain management. *JAMA: Journal of the American Medical Association, 290*, 2470–2475. doi:10.1001/jama.290.18.2470
- Meldrum, M. L. (2007). Brief history of multidisciplinary management of chronic pain, 1900–2000. In M. E. Schatman, A. Campbell, & J. D. Loeser (Eds.), *Chronic pain management: Guidelines for multidisciplinary program development* (pp. 1–13). New York, NY: Informa Healthcare.
- Melzack, R., & Wall, P. D. (1965). Pain mechanisms: A new theory. *Science, 150*, 971–979. doi:10.1126/science.150.3699.971
- Morley, S., Eccleston, C., & Williams, A. (1999). Systematic review and meta-analysis of randomized controlled trials of cognitive behavior therapy and behavior therapy for chronic pain in adults, excluding headache. *Pain, 80*, 1–13. doi:10.1016/S0304-3959(98)00255-3
- Nelson, R. (2003). Decade of pain control and research gets into gear in USA. *Lancet, 362*, 1129. doi:10.1016/S0140-6736(03)14505-9
- O'Connor, A. B. (2009). Neuropathic pain: Quality-of-life impact, costs and cost effectiveness of therapy. *Pharmacoeconomics, 27*, 95–112. doi:10.2165/00019053-200927020-00002
- Oslund, S., Robinson, R. C., Clark, T. C., Garofalo, J. P., Behnk, P., Walker, B., . . . Noe, C. E. (2009). Long-term effectiveness of a comprehensive pain management program: Strengthening the case for interdisciplinary care. *Proceedings (Baylor University Medical Center), 22*(3), 211–214.
- Patient Protection and Affordable Care Act, Pub. L. No. 111-148, 124 Stat. 119 (2010). Retrieved from <http://www.gpo.gov/fdsys/pkg/PLAW-111publ148/pdf/PLAW-111publ148.pdf>
- Potter, J. S., & Marino, E. N. (2013). How to avoid opioid misuse. *Journal of Family Practice, 62*(3, Suppl.), S2–S7.
- Raja, S. N., & Jensen, T. S. (2010). Predicting postoperative pain based on preoperative pain perception: Are we doing better than the weatherman? *Anesthesiology, 112*, 1311–1312. doi:10.1097/ALN.0b013e3181dcd5cc
- Rajaei, S. S., Bae, H. W., Kanim, L. E., & Delamarter, R. B. (2012). Spinal fusion in the United States: Analysis of trends from 1998 to 2008. *Spine, 37*, 67–76. doi:10.1097/BRS.0b013e31820cccfb
- Robbins, H., Gatchel, R. J., Noe, C., Gajraj, N., Polatin, P. B., Deschner, M., . . . Adams, L. (2003). A prospective one-year outcome study of interdisciplinary chronic pain management: Compromising its efficacy by managed care policies. *Anesthesia and Analgesia, 97*, 156–162. doi:10.1213/01.ANE.0000058886.87431.32
- Rodríguez, M. J., & García, A. J. (2007). A registry of the aetiology and costs of neuropathic pain in pain clinics: Results of the Registry of Aetiologies and Costs (REC) in Neuropathic Pain Disorders Study. *Clinical Drug Investigation, 27*(11), 771–782. doi:10.2165/00044011-200727110-00004
- Rothman, A. A., & Wagner, E. H. (2003). Chronic illness management: What is the role of primary care? *Annals of Internal Medicine, 138*, 256–261. doi:10.7326/0003-4819-138-3-200302040-00034
- Runy, L. A. (2007). Pain management: An executive's guide. *Hospitals and Health Networks, 81*(11), 44–51.
- Scascighini, L., Toma, V., Dober-Spielmann, S., & Sprott, H. (2008). Multidisciplinary treatment for chronic pain: A systematic review of inter-

- ventions and outcomes. *Rheumatology*, 47(5), 670–678. doi:10.1093/rheumatology/ken021
- Schatman, M. E. (2007). The demise of the multidisciplinary chronic pain management clinic: Bioethical perspectives on providing optimal treatment when ethical principles collide. In M. E. Schatman (Ed.), *Ethical issues in chronic pain management* (pp. 43–62). New York, NY: Informa Healthcare.
- Shealy, C. N., & Cady, R. K. (2002a). Historical perspective of pain management. In R. S. Weiner (Ed.), *Pain management: A practical guide for clinicians* (6th ed., pp. 9–16). Danvers, MA: CRC Press.
- Shealy, C. N., & Cady, R. K. (2002b). Multidisciplinary pain clinics. In R. S. Weiner (Ed.), *Pain management: A practical guide for clinicians* (6th ed., pp. 45–54). Danvers, MA: CRC Press.
- Shirado, O., Ito, T., Kikumoto, T., Takeda, N., Minami, A., & Strax, T. E. (2005). A novel back school using a multidisciplinary team approach featuring quantitative functional evaluation and therapeutic exercises for patients with chronic low back pain. *Spine*, 30, 1219–1225. doi:10.1097/01.brs.0000162279.94779.05
- Stanos, S. (2012). Focused review of interdisciplinary pain rehabilitation programs for chronic pain management. *Current Pain Headache Reports*, 16, 147–152. doi:10.1007/s11916-012-0252-4
- Tabak, L. A. (2012, February 14). *Testimony [on pain research and care] before the Committee on Health, Education, Labor, and Pensions, United States Senate*. Retrieved from <http://www.help.senate.gov/imo/media/doc/Tabak.pdf>
- Tarnanen, S., Neva, M. H., Dekker, J., Häkkinen, K., Vihtonen, K., Pekkanen, L., & Häkkinen, A. (2012). Randomized controlled trial of postoperative exercise rehabilitation program after lumbar spine fusion: Study protocol. *BMC Musculoskeletal Disorders*, 13, Article 123. doi:10.1186/1471-2474-13-123
- Task Force on Guidelines for Desirable Characteristics for Pain Treatment Facilities. (1990). *Desirable characteristics for pain treatment facilities*. Washington, DC: International Association for the Study of Pain. Retrieved from <http://www.iasp-pain.org/AM/Template.cfm?Section=Home&Template=/CM/HTMLDisplay.cfm&ContentID=3011>
- Thunberg, K. A., & Hallberg, L. R. M. (2002). The need for organizational development in pain clinics: A case study. *Disability and Rehabilitation*, 24, 755–762. doi:10.1080/09638280210124356
- Tsang, A., Von Korff, M., Lee, S., Alonso, J., Karam, E., Angermeyer, M. C., Borges, G. L., . . . Watanabe, M. (2008). Common chronic pain conditions in developed and developing countries: Gender and age differences and comorbidity with depression-anxiety disorders. *The Journal of Pain*, 9, 883–891. doi:10.1016/j.jpain.2008.05.005
- Turk, D. C., & Monarch, E. S. (2002). Biopsychosocial perspective on chronic pain. In D. C. Turk & R. J. Gatchel (Eds.), *Psychological approaches to pain management: A practitioner's handbook* (2nd ed., pp. 3–29). New York, NY: Guilford Press.
- Turk, D. C., & Swanson, K. (2007). Efficacy and cost-effectiveness treatment of chronic pain: An analysis and evidence-based synthesis. In M. E. Schatman & A. Campbell (Eds.), *Chronic pain management: Guidelines for multidisciplinary program development* (pp. 15–38). New York, NY: Informa Healthcare.
- Upshur, C. C., Bacigalupe, G., & Luckmann, R. (2010). “They don’t want anything to do with you”: Patient views of primary care management of chronic pain. *Pain Medicine*, 11, 1791–1798. doi:10.1111/j.1526-4637.2010.00960.x
- U.S. Census Bureau. (2000). *Population projections of the United States by age, sex, race, Hispanic origin, and nativity: 1999 to 2000*. Retrieved from <http://www.census.gov/population/projections/files/natproj/detail/np-d2.txt>
- U.S. Census Bureau. (2001). *The 65 years and over population: 2000* (Census 2000 Brief C2KBR/01-10). Retrieved from <http://www.census.gov/prod/2001pubs/c2kbr01-10.pdf>
- U.S. Department of Health and Human Services. (2006). *Draft guidance for industry: Patient-reported outcome measures: Use in medical product development to support labeling claims*. Rockville, MD: Author.
- Vijayaraghavan, M., Penko, J., Guzman, D., Miaskowski, C., & Kushel, M. B. (2012). Primary care providers’ views on chronic pain management among high-risk patients in safety net settings. *Pain Medicine*, 13, 1141–1148. doi:10.1111/j.1526-4637.2012.01443.x
- Vowles, K. E., McCracken, L. M., & Eccleston, C. (2007). Processes of change in treatment for chronic pain: The contributions of pain, acceptance, and catastrophizing. *European Journal of Pain*, 11(7), 779–787. doi:10.1016/j.ejpain.2006.12.007
- Wall, P. D. (2000). *Pain: The science of suffering*. New York, NY: Columbia University Press.
- Weiner, S. S., & Nordin, M. (2010). Prevention and management of chronic back pain. *Best Practice & Research Clinical Rheumatology*, 24(2), 267–279. doi:10.1016/j.berh.2009.12.001
- Wells, J. C. D., & Miles, J. B. (1991). Pain clinics and pain clinic treatments. *British Medical Bulletin*, 47, 762–785.
- Wright, A. R., & Gatchel, R. J. (2002). Occupational musculoskeletal pain and disability. In D. C. Turk & R. J. Gatchel (Eds.), *Psychological approaches to pain management: A practitioner's handbook* (pp. 349–364). New York, NY: Guilford Press.