QME EVALUATION OF THE CHRONIC PAIN PATIENT

COURSE OUTLINE

Introduction
The QME Evaluation of the Chronic Pain Patient
    Has the applicant been provided with an adequate course of treatment (to reach P/S)?
    What other treatment are recommend and why?
    Is the Pain Impairment Add-on (Chapter 18 of the Guides) appropriate?
Course Overview
Learning Objectives

Part I: Theories and Models of Pain
Pain as Disease
A Definition of Pain: Acute, Recurrent Acute, Chronic
Theories of Pain
When Acute Pain Becomes Chronic
Chronic Pain and Suffering
The Multi-factorial Nature of Pain and Suffering
Factors Influencing Acute and Chronic Pain
Chronic Pain: Depression, Anxiety, Fear, Anger, Entitlement
Other Factors Influencing Pain and Suffering

Part II: Biopsychosocial Assessment of Chronic Pain
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Targets of Assessment
Integrating Assessment Information
Methods of Assessment
Achieving the Goals of Assessment
Reporting the Results of the Evaluation

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Chronic Opioid Therapy for Chronic Noncancer Pain
Aggressive Conservative Treatment
Principles for a Chronic Pain Reconditioning Program
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Enhancing the Validity of the Pre-implant Trial
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INTRODUCTION

It is important for the QME to have an understanding of the evaluation and treatment of chronic pain for at least two reasons:

To assess whether the applicant has been provided an adequate course of treatment for chronic pain.

Since SB 863, the QME will not be specifically addressing treatment issues in dispute or make binding treatment recommendations. That is now the purview of UR and the IMR. Even so, having an understanding of the appropriate assessment and treatment of chronic pain is still essential in determining whether or not an applicant is Permanent and Stationary (condition is stabilized for rating presumably after receiving appropriate treatment). One may be faced with a chronic pain patient who has had little appropriate treatment per accepted guidelines (as reviewed in this course). Although the QME will not make treatment decisions that are automatically approved, he or she can certainly decide that the P and S status has not been reached (due to a lack of appropriate treatment) or has been reached (after appropriate treatment). Either way, knowing what constitutes an appropriate course of treatment for chronic pain is essential.

To suggest treatment approaches that have not been attempted.

Although the QME is no longer the "final say" in terms of treatment (per SB863), the QME report can certainly influence the UR and IMR process. One can certainly imagine a case in which a patient is seen for a QME evaluation and determined not to be Permanent and Stationary. In the report the QME recommends some type of additional treatment for chronic pain (e.g. a pain rehabilitation program, a spinal cord stimulator, etc.). This report now becomes part of the patent's record and can be submitted for review (to UR or IMR) as part of the treatment authorization process. The QME is in the unique position of having all of the information available for inclusion in the report (medical records, testing, etc.). Certainly, having all of this information available, along with citing appropriate guidelines for justification, would be a powerful rationale for approving the treatment.

To determine whether the Pain Impairment Add-on (Chapter 18 of the Guides) might be appropriate.

Even though the AMA Guides emphasize objective assessment of impairment (Chapters 3 through 17), there is a separate allowance for up to an additional 3% whole person impairment (WPI) when pain is above and beyond what would be expected for a particular condition. However, non-verifiable pain conditions as outlined in Chapter 18 (such as fibromyalgia) are not ratable. In California, the schedule for rating permanent disabilities (SRPD) states the following (page 1-12):

Pursuant to Chapter 18 of the AMA Guides, a whole person impairment rating based on the body or organ rating system of the AMA Guides (Chapters 3 through 17) may be increased by 0% up to 3% WPI if the burden of the worker's condition has been increased by pain related impairment in excess of the pain component already incorporated in the WPI rating in Chapters 3-17 (AMA Guides, page 573).

A physician may perform a formal pain related impairment assessment if deemed necessary to justify the increase of an impairment rating based on the body or organ rating system (see Section 18.3F of the AMA Guides starting on page 575). The maximum allowance for pain resulting from a single injury is 3% WPI regardless of the number of impairment resulting from that injury. The addition of up to 3% for pain is to be made at the whole person level. In the case of multiple impairments, the evaluating physician shall, when medically justifiable, attribute the pain in whole number increments to the appropriate impairments. The additional percentage added for pain will be applied to the respective impairments as described in the preceding paragraph. Even under this condition, the total cannot be more than 3% WPI. In order the apply Chapter 18 properly, the QME must be familiar with the chronic pain condition.

COURSE OVERVIEW

Evaluating and working with a chronic pain patient requires a special skill set for the pain management clinician or evaluator. One of the most important issues for the QME evaluation of pain is to have a good understanding of current pain theories and the nature of the chronic pain syndrome. The first section of this course will provide an overview of a definition of pain, different classification systems for pain, as well as outdated and current theories of pain. In addition, the section will discuss various factors that can influence a patient's perception of pain and overall level of suffering. The multi-factorial influences on pain will be reviewed including tissue input (nociception), pain sensation, thoughts, emotions, pain behaviors and the psychosocial environment. Factors impacting the transition from acute to chronic pain will be discussed. Having an understanding of these concepts is critical for the QME.

The second part of this course will review a model for the biopsychosocial assessment of the chronic pain patient. This model is based upon a "targets" of assessment approach developed by Belar and Deardorff (1995, 2008). Methods of assessment for use with the chronic pain patient will also be presented including the clinical interview, questionnaires, patient diaries, psychometric testing, behavioral observation, and reviewing archival data.

The third part of this course will review special issues including common medical areas of treatment. This part of the course will discuss medication management, long term opioid treatment, physical rehabilitation, and spinal cord stimulation.

The QME should have an understanding of appropriate treatments for chronic pain. Completing a permanent and stationary evaluation includes assessing whether appropriate treatment has been obtained by the patient for the condition. If it has not, the one can argue that the applicant is not stabilized for rating purposes. The QME evaluation of the chronic pain patient must take this into account.

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<tr><td>LEARNING OBJECTIVES</td></tr>
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After taking this course, the health care professional will be able to:

Discuss current theories of pain including the gate control theory
Explain the difference between pain and suffering
List the targets of assessment in chronic pain
Summarize the difference between addiction, dependence and tolerance
List the phases of Spinal Cord Stimulation

PAIN AS DISEASE

This section will provide an overview of current theories of pain. The material will be presented in a straightforward and concise manner. The goal of this section is to provide the practitioner with an overview of the important concepts while also presenting the information in a manner that can be used when evaluating or treating chronic pain patients.

Chronic Pain as Disease: Why Does It Still Hurt?

People who suffer from severe chronic pain know how it can utterly disrupt and damage one's life. Pain can be cruel making it hard to enjoy even the simplest daily activities, and certainly making it a challenge to carry out an exercise routine and other healthy activities. Moreover, chronic pain was not previously that well understood. The medical profession used to believe that pain is always a manifestation of an underlying injury or disease. As will be discussed subsequently, it was also believed that the amount of pain correlated highly (almost one-to-one) with the amount of tissue damage or injury. As such, doctors focused on treating the underlying cause with the belief that once the injury or disease was cured the pain would then disappear. If no underlying cause could be found, then the patient was told that very few treatments are available or worse, "the pain must be in your head". Unfortunately, some physicians still practice in this manner, having no appreciation for the unique problem of chronic pain, newer theories about pain, and the many factors that influence a chronic pain problem.

The medical community is starting to understand that if pain is no longer a function of a healthy nervous system (signaling that there is a disease or

underlying injury), then the pain itself becomes the problem and needs to be treated as the primary pathology.

The Experience of Pain

To successfully evaluate a chronic pain patient one must accept that all pain is real. This may seem like an obvious statement, but people with chronic pain are often treated as if their pain is either imaginary or exaggerated. Some of this is perpetuated by the mind-body dualism inherent in the medical model. Unfortunately, this model continues to be alive and well in the medical community. Mind-body dualism espouses the old dichotomy of "functional vs. organic" when evaluating and diagnosing chronic pain. In the model, functional pain is conceptualized to be of purely psychological etiology. A patient is often given this label by his or her physician if a precise reason for the pain cannot be found (identification of a pain generator). In this scenario, the psychological etiology is a diagnosis by exclusion. Given this situation, it is not surprising that many chronic pain patients feel like they have to prove their pain to their friends, family and doctors.

Pain is a personal experience and cannot be measured like other problems in medicine such as a broken leg or an infection. This causes a frustrating experience for the chronic pain patient in interacting with the healthcare system, family and friends. Everyone knows that a broken leg can be confirmed by an X-ray and an infection by a blood test measuring white blood cell count. Unfortunately, there is no medical test to measure pain levels. To make matters more challenging for the chronic pain patient, there may be no solid objective evidence or physical findings to explain the pain. Thus, chronic pain sufferers will go from one doctor to the next searching for medical explanations for their pain (and a cure). This can lead to unnecessary evaluations and treatments, in addition to putting the patient at risk for actually being harmed or made worse by the interventions.

A DEFINITION OF PAIN

Pain is not easy to define. In 1979, the International Association for the Study of Pain (IASP) published its first working definition of pain:

"An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage"

This definition was reaffirmed in 1994 along with an extensive footnote discussion regarding its implications. The IASP definition acknowledges that, for most people, tissue damage is the "gold standard" by which pain is understood. However, the definition also recognizes that pain may occur in the absence of tissue damage and is impacted by emotional (psychological) factors. In the footnote explaining the definition, the authors point out that pain is *not* equivalent to the process by which the signal of tissue damage is passed through the nervous system to the brain

(this is called "nociception" and will be discussed in detail later); rather, pain is always a psychological state that cannot be reduced to objective signs. In other words, pain is *always* subjective.

As shall be discussed later, the pain definition takes into account the following research findings:

• Extensive tissue damage may occur without pain
• Pain may occur in the total absence of tissue damage

Since pain is subjective, everyone experiences and expresses it differently. The IASP definition takes into account research which has demonstrated that individuals with the exact same injury will feel and show their pain in unique ways depending on a number of things such as:

• The situation in which the pain occurs.
• Thoughts about the pain such as "this is nothing serious" versus "this pain could kill me".
• Emotions associated with the pain such as depression and anxiety versus hopefulness and optimism.
• Cultural influences determining whether a person is to be more stoic or more dramatic in showing pain to others.

The newest theories of pain can now explain, on a physiological level, how and why people experience pain differently. The newer pain theories will be discussed in detail later along with clinical and research findings about situational, cognitive, affective and cultural influences on pain.

CATEGORIZING PAIN: ACUTE, RECURRENT ACUTE, CHRONIC

Understanding how pain is categorized is critical to providing proper evaluation and treatment. The classification of pain is not a straightforward task and there is no one system that has been universally accepted by clinicians or researchers. As discussed by Gatchel (2004) and others (Turk and Melzack, 1992), there are many ways that pain can be classified including:

• by the disease state causing the pain or "diagnosis" (e.g., arthritis, cancer, diabetic neuropathy)
• by the mechanism of the pain itself (e.g., neuropathic, musculoskeletal)
• by the age of the sufferer (pediatric, pain in the elderly)
• by temporal profile or duration (e.g., acute, chronic, recurrent)

Probably, the most common classification that is used is *temporal*. As Gatchel (2004) points out, this is likely due to the fact that the temporal classification best helps to understand the biopsychosocial contributors to the pain problem as well as guiding evaluation and treatment. However, it should be kept in mind that a

simple temporal classification also has problems since it does not take into account acute recurrent pain (periodic acute pain episodes with pain-free periods in between) and tends to ignore pain conditions associated with a progressive disease process (cancer, COPD). For the purposes of this discussion we will review the common temporal categories of pain along with modifications to take into account acute recurrent pain and pain associated with a disease process. In this schema, pain can be separated into acute, recurrent acute and chronic. In addition, there will be sub-categories of chronic pain.

Acute Pain

Acute pain is usually indicative of tissue damage and most often serves a protective function for the body signaling potential physical harm. Acute pain can be defined as follows:

- pain that is associated with tissue damage, inflammation, or a disease process
- pain that is of relatively brief duration (e.g., lasting less than 3 to 6 months)

This is the kind of pain that you experience when you cut your finger or stick yourself with a needle. Other examples of acute pain:

- Touching a hot stove or iron: This pain will cause a fast, immediate, intense pain with an almost simultaneous withdrawal of the body part that is being burned. You might then experience more of an aching pain that occurs a few seconds after the initial pain and withdrawal.
- Labor pains: The pain during childbirth is acute and the cause is certainly identifiable
- Smashing your finger with a hammer: This pain is similar to that of touching a hot stove in that there is immediate pain, withdrawal and then "slower" aching pain.

In acute pain there is likely to be a one-to-one relationship between the amount of tissue damage and the pain experience. In addition, the pain will tend to subside in correlation with tissue healing. Acute pain is often associated with some anxiety that will motivate the individual towards adaptive and self-protective behavior (e.g., resting the injured body part during tissue healing, seeking medical attention, etc).

Acute Recurrent Pain

In acute recurrent pain the individual suffers from pain episodes with pain-free periods in between. The pain episodes are usually brief (e.g., less that 3 months) and associated with an identifiable physical process (such as migraine headaches, sickle cell anemia, back sprain, etc).

Chronic Pain

In contrast to acute pain, chronic pain is usually less indicative of tissue damage and generally does not serve a protective function for the body. A temporal definition of chronic pain is as follows:

• pain that occurs past the point of tissue healing or,
• pain that lasts more than 3 to 6 months

As discussed previously, this definition emphasizing the temporal component is not completely adequate for all types of chronic pain problems. Even so, the psychological principles of chronic pain assessment and treatment remain the same. There are at least three types of chronic pain problems: (1) chronic pain that is due to a clearly identifiable cause or process, (2) chronic pain that is "non-specific" and there is no clearly identifiable pain generator that explains the pain, and (3) chronic pain that is due to some type of nerve damage or abnormal nervous system reaction.

Chronic Pain Associated with a Progressive Disease

In chronic pain associated with a progressive disease there is an ongoing disease process that is causing the pain. This might include such conditions as cancer, COPD, muscle spasm in multiple sclerosis, etc. These conditions are often actually categorized by disease state (e.g., cancer pain) and this dictates special evaluation and treatment approaches.

Chronic Non-cancer Pain

Several terms have been developed for chronic pain in which a specific disease process or pain generator cannot be identified or does not account for the level of pain and suffering being reported by the patient. These include chronic pain, chronic benign pain, chronic non-cancer pain, and chronic non-specific pain. For the purposes of this discussion we will simply use the term "chronic pain". In this type of chronic pain, the problem may have started with an acute injury or trauma (e.g., back injury, etc) and developed into a chronic pain problem of more than 6 months duration such as chronic non-specific low back pain, fibromyalgia, etc.

It appears that pain can set up a pathway in the nervous system and, in some cases this becomes the problem in and of itself. In this type of chronic pain the nervous system may be sending a pain signal even though there is no ongoing tissue damage, or the tissue injury (e.g., pain generator) is less than what would be expected given the patient's pain experience. The nervous system itself misfires and creates the pain. As we shall discuss, the pain signal from the peripheral nervous system is enhanced by higher level central nervous system processes. In such cases, the pain is the disease rather than a symptom of an injury.

Chronic Neuropathic Pain

Neuropathic pain has only been investigated relatively recently and seems to involve some type of direct injury to the nerves. In most types of neuropathic pain, all signs of the original injury are usually gone and the pain that one feels is unrelated to an observable injury or condition. With this type of pain, certain nerves (that have been injured or irritated) continue to send pain messages to the brain even after the initial tissue damage has healed.

Neuropathic pain (also called nerve pain or neuropathy), is very different from pain caused by an underlying injury. While it is not completely understood, it is thought that injury to the sensory or motor nerves in the peripheral nervous system can potentially cause neuropathy. Neuropathic pain is placed in the chronic pain category but it has a different feel then chronic pain of a musculoskeletal nature.

Neuropathic pain feels different than musculoskeletal pain, and is often described with the following terms: severe, sharp, lancinating, lightning-like, stabbing, burning, cold, and/or ongoing numbness, tingling or weakness. It may be felt traveling along the nerve path from the spine down to the arms/hands or legs/feet. Different types of neuropathic pain conditions include reflex sympathetic dystrophy (or Complex Regional Pain Syndrome), trigeminal neuralgia, postherpetic neuralgia, radiculopathy, etc.

CHRONIC PAIN VERSUS ACUTE PAIN

Unfortunately, many physicians still treat all pain as acute pain using a unilateral medical model. Medical evaluation of acute pain might involve extensive diagnostic testing such as MRI, CT, and diagnostic nerve blocks to determine the cause of the pain (or "pain generator"). Treatment often includes medications, physical immobilization, invasive procedures, and surgery to try to correct the source of the pain. The medical approach is generally quite appropriate in acute pain cases (e.g., repair the bone fracture, torn muscle or herniated disc). However, this strictly bio-medical approach can be exactly the wrong thing to do in cases of chronic non-specific pain. In fact, treating non-specific chronic pain as if it were acute pain will likely make the patient worse since it reinforces the sick role and subjects the patient to iatrogenic problems. In addition, treating the other type of chronic pain problems (progressive disease, neuropathies) strictly from a medical model is also inappropriate. It is important to keep in mind that any type of chronic pain problem (and acute pain problem for that matter) is susceptible to the influence of psychosocial factors.

"In patients with chronic pain, psychological reactions to the pain become the major contributors to impaired functioning. These include anxiety, helplessness, escape/avoidance behaviors, depression, and increased pain behaviors. The perpetuation of pain thus has emotional, behavioral, and physiologic components." (p. 108).

It is critical for the physician and patient to have an understanding of the difference between acute and chronic pain. Evaluation and treatment approaches will be different depending upon the type of pain problem.

THEORIES OF PAIN

Old Ideas: The Specificity Theory of Pain

Rene Descartes proposed one of the original theories of pain in 1664. His theory proposed that a specific pain system carried messages directly from pain receptors in the skin to a pain center in the brain. He suggested that it is like a bell-ringing mechanism in a church such that a man pulls the rope at the bottom of the tower and the bell rings at the top. In this model there is a one-to-one relationship between tissue injury and the amount of pain a person experiences. For instance, if you stick your finger with the needle you would experience minimal pain; whereas, if you cut your hand with a knife you would experience much more pain. Thus, the specificity theory proposes that the intensity of pain is directly related to the amount of tissue injury. The specificity theory underwent modifications throughout the 19th and early 20th centuries but its basic assumptions were unchanged (See Melzack and Wall, 1973, for a discussion of other pain theories including Muller's doctrine of specific nerve energies, 1842; Von Frey's theory, 1894; pattern theories, various theorists from 1894 through the mid-1950's; Livingston's central summation theory, 1943; and, Noordenbos' sensory interaction theory, 1959).

The specificity theory is generally accurate for acute pain, but it does not explain many types of chronic pain. Unfortunately, variations on the specificity theory are still taught (or at least emphasized) in many medical schools and a majority of doctors still ascribe to it in practice. The theory assumes that if surgery or

medication can eliminate the alleged "cause" of the pain, then the pain will disappear. In chronic pain cases, this is very often not true. If a doctor continues to apply the specificity theory to a chronic pain problem the patient is at risk for getting surgeries, medicines and procedures that will not work as the search for the "source of the pain" presses on. Ultimately, the validity of the patient's pain complaints will be challenged if reasons cannot be found and the "treatments" do not work.

Problems with the Specificity Theory

Several research findings and clinical observations have proven the specificity theory to be inadequate and these can be summarized as follows (See Wall and Melzack, 1973; Turk and Gatchel, 2002, for a more detailed discussion):

The meaning of the situation influences pain. Dr. Henry Beecher worked with severely wounded soldiers during World War II. To his surprise, Dr. Beecher observed that only one out of three soldiers carried into a combat hospital complained of enough pain to require morphine. Most of the soldiers either denied having pain from their significant injuries or had so little pain that they declined medication. These soldiers were not in a state of shock nor were they unable to feel pain since they complained when the IV lines were placed.

When Dr. Beecher returned to his practice in the United States after the war he noticed that trauma patients with wounds similar to the soldiers he had treated required morphine to control their pain at a much higher rate. In fact, four out of five patients required morphine for pain from wounds similar to those he had seen in the combat soldiers. Dr. Beecher concluded that this evidence demonstrated there was not a direct relationship between the wound and the amount of pain experienced. He believed the *meaning* attached to the injuries in the two groups explained the different levels of pain. To the soldier, the wound meant thankfulness to escape alive from the battlefield and to be going home. Alternatively, the injury to a civilian often meant major surgery, loss of income, loss of activities, and many other negative consequences.

Pain after healing of an injury. Another finding that discounted the specificity theory was that of phantom limb pain. Many times patients who undergo the amputation of a limb continue to report sensations that seem to come from the limb that has been amputated. This might include feeling that the limb is still there, or it may be a sensation of pain. Of course, the sensations cannot be actually coming from the limb since it has been removed from the person's body. The specificity theory cannot account for these findings since there is no ongoing tissue injury in the amputated limb.

Injury without pain and pain without injury. Injury without pain can occur in a variety of situations including individuals who are born without the ability to feel pain. These patients must learn to avoid damaging themselves severely since

there is no "protective function" from pain. The following is just such a case as reported on CNN.com Health (November 1, 2004):

Case Example: Injury Without Pain

If 5-year-old Ashlyn's chili is scalding hot, she'll gulp it down anyway. On the playground, a teacher's aide watches Ashlyn closely, keeping her off the jungle gym and giving chase when she runs. If she takes a hard fall, Ashlyn won't cry. Ashlyn is among a very small group of people in the world known to have congenital insensitivity to pain with anhidrosis, or CIPA -- a rare genetic disorder that makes her unable to feel pain. The untreatable disease also makes Ashlyn incapable of sensing extreme temperatures -- hot or cold -- disabling her body's ability to cool itself by sweating. The genetic mutation that causes CIPA only disrupts the development of the small nerve fibers that carry sensations of pain, heat and cold to the brain.

Another fairly common situation is a person being distracted when injured such that pain is not felt. In this case, it is not uncommon to hear stories of accident victims presenting to the emergency room stating they were injured (including major lacerations of the skin and fractured bones) but did not experience pain until minutes or hours afterwards.

Pain without injury or after the point of complete tissue healing can occur in a number of medical conditions such as central neuropathic pain after a stroke, reflex sympathetic dystrophy (complex regional pain syndrome), phantom limb pain, and post-herpetic neuralgia.

Hypnosis for anesthesia. The specificity theory cannot explain how hypnosis can be used for anesthesia during surgery. Certain people under hypnosis can withstand high levels of pain that would normally cause them to cry out. Surgery has been done on almost every part of the body using only hypnosis for anesthesia. Obviously, significant tissue damage is occurring during the surgery but the patient under hypnosis is not experiencing any pain. This finding dealt the specificity theory its final blow!

NEW IDEAS: THE GATE-CONTROL THEORY OF PAIN

Due to the findings listed previously a new theory of pain was developed in the early 1960's that could explain these results. It is called the gate control theory of pain and it was developed originally by Melzack and Wall (1965). The gate control theory changed the way in which pain perception was viewed. The original theory is very complex and a detailed discussion is beyond the scope of this presentation. However, it will be valuable to present an overview of the theory in language that

can be used with patients. Explaining the basics of this theory to patients can help establish the credibility of psychological pain management interventions. It will also demonstrate to the patient that the psychological intervention can actually change (decrease) the experience of pain on a physiological level.

The gate control theory attempts to explain the experience of pain (including psychological factors) on a physiological level. Based upon subsequent challenges and findings, the original gate control theory has undergone some reformulation and revision but the basic tenets hold true. It has been able to explain a variety of pain phenomena and has had enormous heuristic value in stimulating further research (Turk and Flor, 1999).

In the gate control theory, pain is divided into two components which are processed by the body separately. These are:

- the peripheral nervous system which is outside of the brain and spinal cord, and
- the central nervous system which includes the spinal cord and the brain.

Pain messages flow along the peripheral nerves to the spinal cord and proceed to the brain. In the spinal cord there are "nerve gates" (in the dorsal horn substantia gelatinosa) that can inhibit (close) or facilitate (open) nerve impulses going from the body to the brain. These nerve gates are influenced by a number of factors including the diameter of the active peripheral fibers converging in the dorsal horns as well as "instructions" coming down from the brain.

The relative excitatory activity in the afferent large-diameter (myelinated) and small-diameter (unmyelinated nociceptor) fibers is thought to influence the spinal gates. The activity in the A-beta (large diameter) is thought to primarily inhibit transmission (close the gates) whereas the A-delta and C (small diameter) activity are thought to primarily facilitate transmission (open the gate). When the gates are more open, a person experiences more pain since the messages flow freely. When the gates close, the pain is decreased or may not be experienced at all. The specifics of each part of the pain system are discussed in the following paragraphs. These are important concepts because they explain why various treatments are effective.

The Peripheral Nervous System

This will be a brief review of the psychophysiology of pain. Sensory nerves bring information to the spinal cord from various parts of the body. These nerves are specialized to detect: pain, heat, cold, vibration, and touch. At least two types of small diameter nerve fibers are thought to carry the majority of pain messages to the spinal cord:

- A-delta nerve fibers carry electrical messages to the spinal cord at approximately 4 to 44 meters per second ("first" or "fast" pain).

- C-fibers carry electrical messages at approximately .5 to 1 meter per second to the spinal cord ("slow" or "continuous pain").

As discussed previously, the activity of the A-delta and C fibers tend to facilitate transmission of the nerve impulse ("open" the spinal nerve gates). In addition, they result in a different pain sensation. A good example of how these different nerve fibers work is when you strike your "funny bone" in your elbow (actually the ulnar nerve). You may notice that the first sensation is a sharp, tingling pain followed by a second sensation of achiness. The first sensation is the activation of the A-delta nerve fibers followed by the activation of the slower C-fibers. The activation of different nerve fibers can produce different qualities of pain sensation.

Also, you may have noticed that when you strike your elbow or hit your head, rubbing the area seems to provide some relief. This is because you are activating other sensory nerve fibers. These nerve fibers carry *pressure* and *touch* messages to the spinal cord:

- These fibers are called "A-beta fibers" and they send their message at approximately 93 to 103 meters per second.

These speeding messages can reach the spinal cord and brain to override some of the pain messages carried by the A-delta and C-fibers. When this overriding occurs, the pain messages are decreased and you experience less pain. The action of these differing nerve fibers can explain why many treatments for pain are effective. Treatments such as massage, heat, cold, TNS (transcutaneous nerve stimulation), or acupuncture can change a pain message due to some of these differences in nerve fibers.

The Spinal Cord

The pain message travels along the peripheral nervous system until it reaches the spinal cord. At this point, an extremely complex system can:

- Send the message directly to the brain
- Change the message being sent to the brain
- Stop the message from reaching the brain

As discussed previously, the gate control theory proposes that there are gates on the bundle of nerve fibers in the spinal cord between the peripheral nerves and the brain. These spinal nerve gates can either open to allow pain impulses to move freely from the peripheral nerves to the brain, or they can close to stop the pain signals from reaching the brain. Many factors determine how the spinal nerve gates will manage the pain signal including:

- The intensity of the pain message

- The competition from other incoming nerve messages (such as touch, vibration, heat, etc)
- Signals from the brain telling the spinal cord to increase or decrease the priority of certain pain messages.

The Brain

Once the pain signal reaches the brain, a number of different things can happen. Certain parts of the brain stem can inhibit or muffle incoming pain signals by the production of endorphins, which are naturally occurring morphine-like substances. Stress, excitement, and vigorous exercise are among the things that may stimulate the production of endorphins. This is why athletes may not notice the pain of a fairly serious injury until the "big" game is over. This is also why regular aerobic exercise can be an excellent method to help control chronic pain.

In addition, pain messages may be directed along different pathways in the brain. For instance, a fast pain message is relayed by the spinal cord to specific locations in the brain: the thalamus and cortex. A fast pain message reaches the cortex quickly and prompts the individual to take action to reduce the pain or threat of injury.

In contrast, chronic pain tends to move along a "slow pain" pathway. As discussed above, slow pain tends to be perceived as dull, aching, burning, and cramping. Initially, the slow pain messages travel along the same pathways as the fast pain signals through the spinal cord. Once they reach the brain, the slow pain messages take a pathway to a different portion of the brain, the hypothalamus and the limbic system. The hypothalamus is responsible for the release of certain stress hormones in the body. The limbic system is the brain area where emotions are processed. As shall be discussed later, this is one reason why chronic pain is often associated with stress, depression, and anxiety. The slow pain signals are actually passing through brain areas that control these experiences and emotions.

ACOEM: The Seattle Model of Pain

The ACOEM Practice Guidelines (2004, p. 107) discussed the Seattle model which hypothesizes several dimensions or levels of pain including:

- Cellular-chemical level including tissue damage, inflammation, and nociception

- Nervous system transmission and perception

- Response-reaction including fear, anger, and frustration with a possible affective component such as depression or suffering

- Psycho-social-behavioral dimension with components of somatization, secondary gain, and personality disorders

These conceptual dimensions correspond to the gate control theory of pain. The ACOEM Guidelines go on to discuss the importance of being aware of these dimensions of pain in order to provide proper evaluation and treatment.

As discussed previously, the brain also controls pain messages by attaching meaning to the situation in which the pain is experienced. This occurs in the cortex, which is a higher level of the brain where thinking takes place. As reviewed previously, soldiers who were wounded in combat displayed much less pain then similarly wounded civilians who had been involved in a trauma such as a car accident. The meaning that the brain attached to the situation seemed to be the important difference. The brain also gives meaning to the pain signal and this occurs in the cortex. Depending on how the messages are received and other factors related to the situation, the brain may pay close attention to the pain signal, or choose to ignore it altogether.

DOWN THE PAIN PATHWAYS

So far we have primarily focused on factors that influence the pain signal as it travels from the periphery to central structures (afferent input). In addition to these influences, the pain signal can be influenced by efferent neural impulses that descend from the brain. In other words, the brain can send signals down the spinal cord to open and close the nerve gates. At times of anxiety or stress, the descending messages from the brain may actually amplify the pain signal at the nerve gate as it moves up the spinal cord. On the other hand, the descending message from the brain can "close" the nerve gate in the spinal cord and the message will be stopped at the closed nerve gate (no pain experienced by the brain). This can occur in situations such as being in battle, playing competitive sports, being under hypnosis, being distracted, etc.

Opening and Closing the Pain Gates

In working with chronic pain patients it is important to carefully explain the gate control theory of pain along with providing examples as previously discussed. This provides an excellent foundation to discuss what factors can open and close the spinal nerve gates. The following presentation can be helpful for patients. The illustration is also useful:
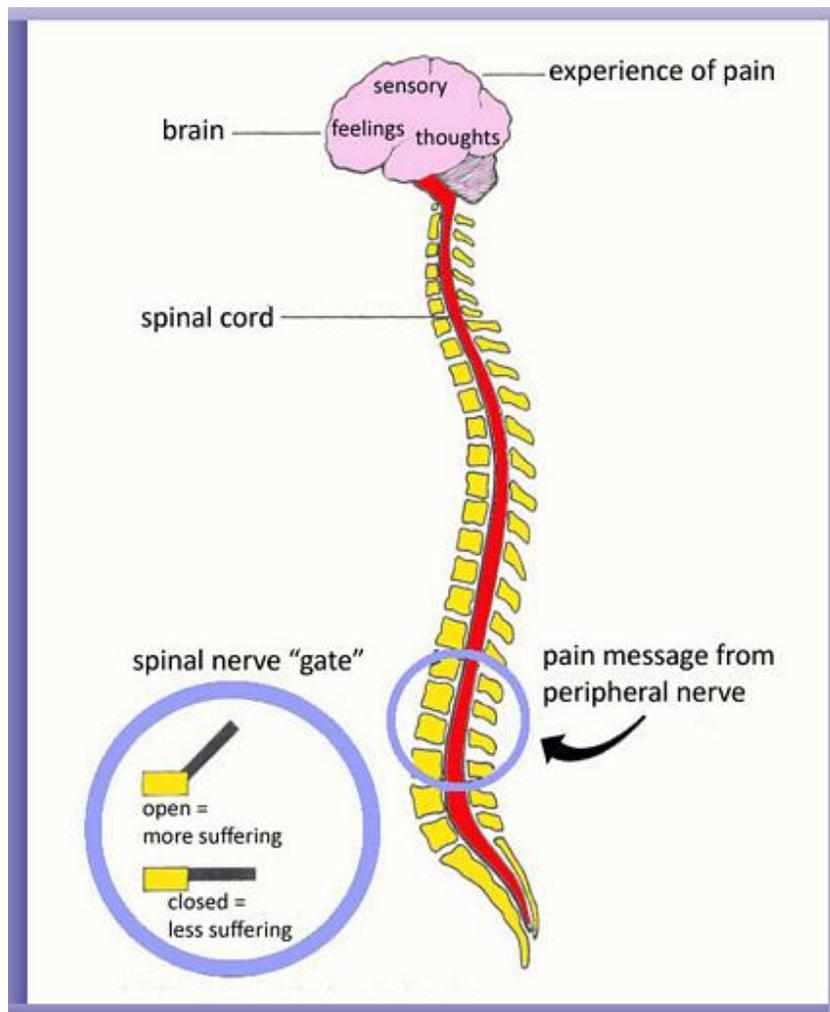
Let's look at a number of other things that can open or close the pain gates as messages move up and down the spinal cord. These can be divided into sensory, cognitive, or emotional areas:

Sensory factors include things that are related to your actual physical being and activities.

Cognitive factors are those things that are related to your thoughts. This might include your memories, your interpretation of a current situation, or your predictions about the future.

Emotional factors are those things related to your emotions or feelings. Emotions are being happy, sad, mad, or glad.

Some examples of sensory, cognitive, and emotional factors that influence pain perception can be seen in the following table.

Opening and Closing the Pain Gates

Factors that **open** the pain gates and cause more suffering are:

Sensory factors are such things as injury, inactivity, long-term narcotic use, poor body mechanics, and poor pacing of your activities.

Cognitive factors are focusing on the pain, having no outside interests, worrying about the pain, remembering bad things associated with the pain, and thinking that your future is a catastrophe.

Emotional factors include depression, anger, anxiety, stress, frustration, hopelessness, and helplessness.

Factors that **close** the pain gates and cause less suffering are:

Sensory factors can include increasing your activity, short-term use of pain medication, relaxation training and meditation, as well as aerobic exercise.

Cognitive factors include outside interests, thoughts that help you cope with the pain, and distracting yourself from the pain.

Emotional factors that can close the pain gates include having a positive attitude, decreasing depression, being reassured that the pain is not harmful, taking control of your pain and your life, and stress management.

WHEN ACUTE PAIN BECOMES CHRONIC

Not all pain that persists will turn into chronic pain. Pain is experienced very differently for different people. Likewise, the effectiveness of a particular treatment will often differ from person to person. For example, a particular medication or injection for a herniated disc may provide effective pain relief for some people but not for others.

Not all patients with similar conditions develop chronic pain, and it is not understood why some people will develop chronic pain and others will not. Also, a condition that appears relatively minor can lead to severe pain, and a serious condition can be barely painful at all.

ACOEM: Warning Signs of Delayed Recovery

The ACOEM Practice summarize the evidence-based research literature in outlining warning signs or "**yellow flags**" that are predictive of the transition from acute to chronic pain. The yellow flags include such things as:

- Work dissatisfaction
- Substance abuse
- Family disorders
- Psychological problem (e.g. depression)
- Patient lack of motivation
- Illness behavior (symptom exaggeration)
- Inappropriate or ineffective treatment
- Legal issues

If psycho-social issues are identified and major obstacle to return to work, behavioral health intervention may be indicated and more appropriate then ongoing medication, physical therapy, interventional pain management techniques or surgery.

As pain moves from the acute phase to the chronic stage, influences of factors other than tissue damage and injury come more into play. Also, influences other than tissue input become more important as the pain becomes more chronic. These include such things as ongoing "pain" signals in the nervous system even though there is no tissue damage, as well as thoughts and emotions, as discussed previously. This can be a difficult concept for chronic pain patients to accept. A common retort is, "but my pain is real". Remember, as we discussed at the beginning of this section, all pain is real and physically experienced. But, the gate control theory establishes that pain can be affected by a variety of factors other than tissue input. After a discussion of the gate control theory and some of these examples, patients are often more open to accepting the idea of psychological pain management treatment.
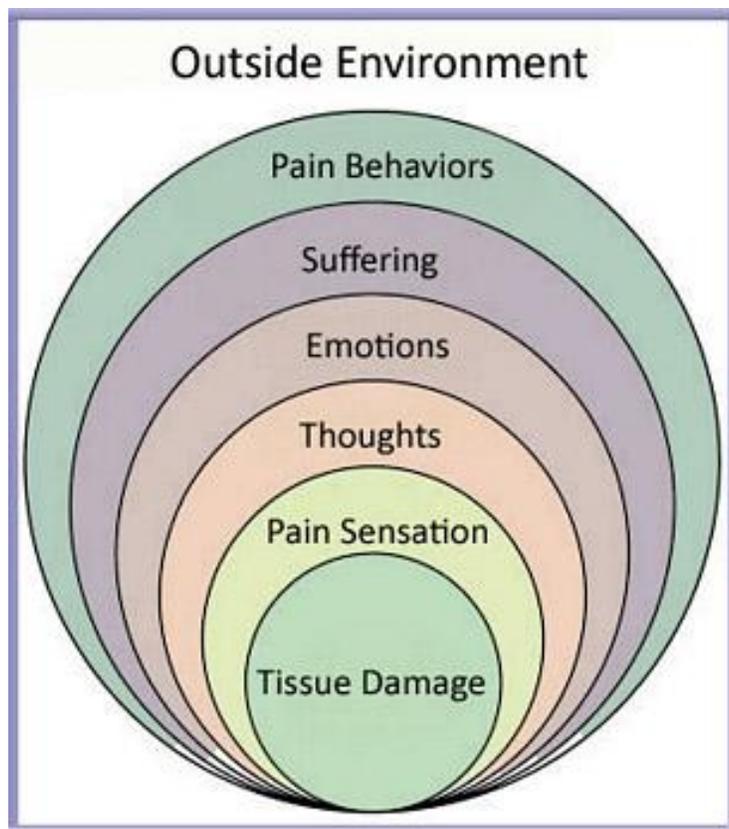
CHRONIC PAIN AND SUFFERING

"Those who have something better to do, don't suffer as much". – W. Fordyce, Ph.D.

There are many things that can increase or decrease a patient's perception of pain. These influences on pain perception are explained by the gate-control theory. This section will be a further discussion of these issues, as it is an area most commonly neglected in traditional approaches to chronic pain. These factors

are well known to the research and academic communities but rarely acknowledged in general practice.

The Pain System

As explained by the gate control theory of pain, there is not a one-to-one relationship between tissue damage and pain, as the specificity theory postulated. Rather, many factors influence chronic pain, disability, and suffering. Thus, a person can have severe pain with minimal physical findings and minimal pain with horrendous physical findings. The "onion" model describes in a simple format what is currently known about aspects of chronic pain. The model makes common sense given the examples discussed in the previous section such as hypnosis and phantom-limb pain. In using this model with patients they can immediately understand the importance of addressing all aspects (or "layers") of the chronic pain problem. The following are definitions of the various "layers" of pain in the model. The diagram depicts the pain system and the various influences on chronic pain. Tissue damage is only one of many factors determining how much pain will be experienced. This pain system model is excellent for use in working with chronic pain patients.

THE MULTI-FACTORIAL NATURE OF PAIN AND SUFFERING

Tissue Damage or Nociception

This is defined as mechanical, thermal (heat or cold), or chemical energy acting on specialized nerve endings that send an impulse, or "signal," into the nervous system that negative events are occurring. The "transduction" of tissue trauma into neural signal depends upon sensory end organs known as nociceptors (Chapman, Nakamura, & Flores, 1999). Nociceptors are sensory neurons found throughout the body.   As discussed previously, these nociceptors consist of:

- A-delta fibers
  - conduct impulses at 4 to 44 meters per second
  - thinly myelinated
  - function as thermal and/or mechanical nociceptors
  - produce pain sensation that is sharp or pricking

- C-fibers
  - conduct impulses slowly (.5 to 1 meters per second)
  - unmyelinated
  - polymodal receptors that respond to various high-intensity mechanical, chemical and thermal stimuli.
  - produces pain sensation that is burning or aching

Both of these types of fibers are distributed widely in skin and deep tissues. These nociceptors are usually the beginning point of the "pain" message. Pain is produced by repetitive stimulation of these receptors. It might include an impact or trauma (mechanical, such as cutting yourself), an injury involving temperature (thermal, such as burning yourself), or an injury involving chemical changes (chemical, such as an irritant). Nociception is what occurs at the site of injury that usually leads to pain being experienced.

Pain Sensation

In the simplest terms of this model, pain is the actual perception that occurs in the brain after the nerve signal (due to nociception) travels from the periphery to the central nervous system. Pain sensation is experienced in the brain, while nociception occurs at the site of injury. However, it must also be kept in mind that a pain sensation can be experienced without nociception as discussed in the last section on phantom limb pain. In addition, there may be no pain sensation even with extensive nociceptive input (the severely wounded soldier or surgery under hypnosis).

Thoughts

Cognitions or thoughts occur in higher brain centers and are an assessment of the pain sensation signal coming into the nervous system as well as events surrounding it. These thoughts can be conscious or unconscious and will greatly influence how the pain signal is perceived. For instance, general body aches and stiffness are perceived as "good pain" when these occur after a vigorous exercise session, whereas they are perceived as "bad pain" when related to a medical condition, such as fibromyalgia. The level of actual input to the nervous system may be the same, but the thoughts about the input cause the pain in the patient with fibromyalgia to be perceived as much more distressing.

In the case of chronic back pain (and other chronic pain conditions) a similar assessment of the situation occurs in the patient. Many patients are convinced that

their chronic pain represents serious damage even though physical findings are minimal. They believe that "hurt equals harm" and are totally guided and controlled by the pain. In these people suffering is very great. Alternatively there are people (a smaller group by far) who have very severe findings on their diagnostic tests (e.g., MRI, CT of the spine) yet who don't seem to be bothered by the pain. They perceive their pain as benign or not dangerous. They live their lives regardless of the pain, and overall suffering is thereby diminished. Thus, these differences in pain sensation can be explained by differences in thoughts and attitudes about the pain.

Emotions

The emotional aspect of pain is a person's response to thoughts about the pain. If you believe (thoughts) the pain is a serious threat, then emotional responses will include fear, depression, and anxiety, among others. Conversely if you believe the pain is not a threat, then the emotional response will be negligible. Consider, again, the previous example of a strenuous workout. The day afterward the person may show grimacing, slow movements, and other "pain behaviors." Even so, the thoughts about the pain will be positive ("Boy, what a good workout that was last night") and the emotions will follow similarly (e.g., feeling good about having worked so hard). The thoughts and subsequent emotional response would be quite different in the case of a fibromyalgia flare-up even though the nociceptive input and pain behaviors are similar.

Suffering

As discussed by Morris (2003), the term "suffering" is often used as a synonym for "pain" even though they are theoretically and conceptually distinct. As Morris (2003) discusses, a broken bone may cause pain without suffering or a great level of suffering. When faced with the same level of nociceptive input, understanding why one individual will demonstrate a great level suffering while another will show minimal suffering is critical to the evaluation and treatment of chronic pain. Unfortunately, the theoretical and conceptual distinction between pain and suffering is often neglected in clinical practice, which can negatively impact the evaluation and treatment of the patient's condition.

Suffering is very closely tied to the emotional aspect of pain. In general it is triggered by aversive events, such as loss of a loved one, fear, or a threat to one's well-being. Suffering very often occurs in anticipation of a possible perceived threat even though the threat may or may not actually exist. A very good example of this last scenario is similar to what was presented in the last section. A patient with severe headaches was firmly convinced she had a brain tumor. Her husband had recently died of a brain tumor that had started with simple headaches. Her suffering was very high, since she was anticipating her head- aches were a sign of a very serious condition that could lead to death. After the MRI it was confirmed that she did not have a tumor and that her headaches were likely due to muscle

tension. Her suffering decreased significantly, as did her pain. This illustrates extreme suffering in response to a threat that never actually existed. It also illustrates how a patient's level of suffering can change even when the nociceptive input and pain sensation do not.

Pain Behaviors

Pain behaviors are defined as things people do when they suffer or are in pain. These are behaviors that others observe as typically indicating pain, such as the following:

- talking or complaining about the pain
- grimacing, moaning, crying, limping, moving slowly
- taking pain medicine, rubbing a painful area
- moving more slowly, asking for help, lying down
- avoidance of certain activities, seeking further treatment

Pain behaviors are in response to all the other factors in the pain system model (tissue damage, pain sensation, thoughts, emotions, and suffering). Pain behaviors are also affected by previous life experiences, expectancies, and cultural influences in terms of how the pain is expressed. Interestingly pain behaviors are also affected by the outside environment, as will be discussed in the next section.

Psychosocial Environment

Psychosocial environment include all of the environments in which we live, work, and play. Research has consistently shown that these environments influence how much a person will show pain behaviors. One might also expect that pain behaviors will vary across the different psychosocial environments of the patient. Chronic pain can affect all aspects of a person's life including relationships, work activity, sexual functioning, recreational pursuits, and so on. Exactly how these environments can affect the patient's pain and suffering are important to evaluate.

FACTORS INFLUENCING ACUTE AND CHRONIC PAIN

As we discussed in the previous section, pain can generally be divided into acute and chronic phases based upon the length of time in pain and how fast the tissues are expected to heal. It is very important to understand that as pain moves from the acute to the chronic stages, the influences of other factors in the pain system (aside from tissue damage) come more into play. Gatchel (1991, 1996, 2004) has characterized this progression from acute to chronic pain as both mental and physical deconditioning. Physical deconditioning is the result of disuse, medication use, muscle weakness and other factors. Mental deconditioning is depression, anxiety, helplessness and hopeless as a result of such things as fear of the pain, loss across a number of psychosocial environments, etc. The model suggests physical and mental re-conditioning as viable treatments.

ACOEM: System-Induced Functional Disability

As discussed in the ACOEM Practice Guidelines (2004), a new warning sign or yellow flag for delayed recovery (and transition to a chronic pain syndrome) is "iatrogenic disability" (p. 87). This idea suggests that the medical and workers compensation systems actually contribute to the development of the chronic pain syndrome (CPS) or "functional disability" (p. 88). Important points about this concept include:

- Functional disability is not malingering
- Patients with functional disability truly believe they are too sick to work
- Functional disability occurs due to primary and secondary gain factors operating within a complex and fragmented system
- A critical time for intervention is the transition from acute to CPS or functional disability

Any treatment intervention to prevent a system-induced functional disability syndrome must address important factors influencing its emergence. This includes psycho-social factors which are frequently overlooked in favor of strictly bio-medical treatment.   A behavioral health evaluation can help identify important psycho-social influences that need to be addressed.

This model can be applied to a number of chronic pain problems, especially those of a musculoskeletal nature. As discussed in the model, as the pain goes on longer and longer, factors other than tissue input become more influential. This can be a difficult concept for patients to understand, and the common retort is, "But I have real pain." Again, as a reminder, the pain is absolutely real and is physically experienced. It is simply being supported and increased by factors other than the tissue damage. Another conceptual model of the various factors influencing acute versus chronic pain can be seen in the figure.

Acute Pain — Tissue Input, Thoughts, Emotions

Chronic Pain — Thoughts, Tissue Input, Emotions
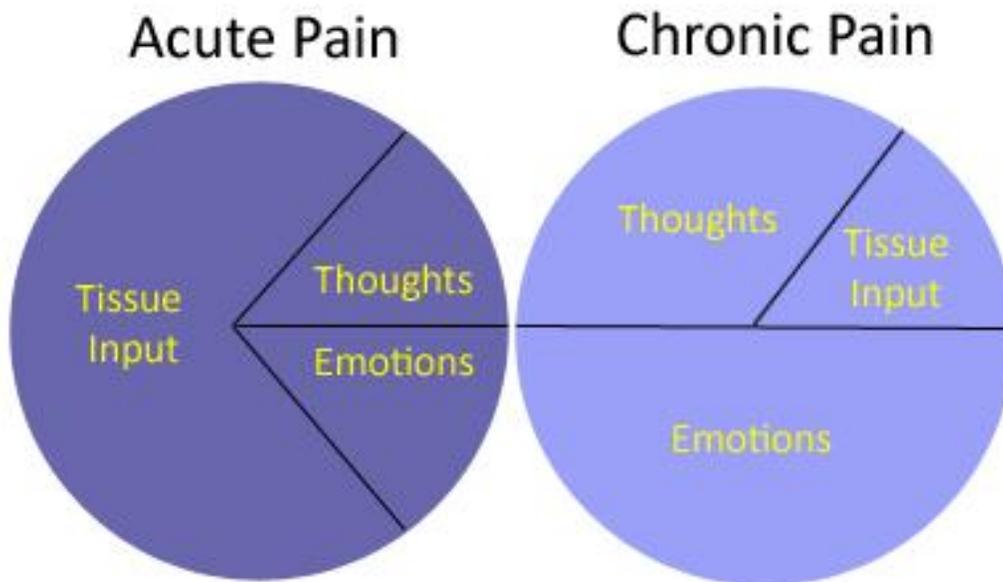
As we discovered in the pain system model, thoughts, emotions, and suffering are an integral part of any chronic pain experience. In this section we will further investigate how emotions influence pain and vice versa. These emotions include depression, anxiety, fear, and anger.

CHRONIC PAIN AND DEPRESSION

Comorbid psychiatric disorders commonly occur in chronic pain patients and, of these, depression is common. Chronic pain and depression are two of the most common health problems that health professionals encounter, yet only a handful of studies have investigated the relationship between these conditions in the general population (Currie and Wang, 2004). For instance, major depression is thought to be four times greater in people with chronic back pain than in the general population (Sullivan, Reesor, Mikail & Fisher, 1992). In research studies on depression in chronic low back pain patients seeking treatment at pain clinics, prevalence rates are even higher. These range from 32 to 82 percent of patients showing some type of depressive problem, with an average of 62 percent (Sinel, Deardorff & Goldstein, 1996). In a recent study of chronic disabling occupational spinal disorders in a large tertiary referral center, the prevalence of major depressive disorder was 56% (Dersh, Gatchel, Mayer et al., 2006). In another study it was found that the rate of major depression increased in a linear fashion with greater pain severity (Currie and Wang, 2004). It was also found that the combination of chronic back pain and depression was associated with greater disability than either condition alone.

Depression is more commonly seen in chronic back pain problems than in those of an acute, short-term nature. The development of depression in these cases can be understood by looking at the host of symptoms often experienced by the person

with chronic spine pain. Clinical depression goes beyond normal sadness and is characterized by the following symptoms from the DSM-IV:

Symptoms of Clinical Depression
A predominant mood that is depressed, sad, blue, hopeless, low, or irritable, which may include periodic crying spells. Poor appetite or significant weight loss or increased appetite or weight gain. Sleep problem of either too much (hypersomnia) or too little (hyposomnia) sleep. Feeling agitated (restless) or sluggish (low energy or fatigue). Loss of interest or pleasure in usual activities. Decreased sex drive. Feeling of worthlessness and/or guilt. Problems with concentration or memory. Thoughts of death, suicide, or wishing to be dead.

Chronic pain often results in difficultly sleeping which leads to fatigue and irritability during the day. During the day the chronic pain patient often has difficulty with most activities (moving slowly and carefully) as well as spending most of the time at home away from others. This leads to social isolation and a lack of enjoyable activities. Due to the inability to work, there may be financial difficulties that begin to impact the entire family. Beyond the pain itself, there may be gastrointestinal distress caused by anti-inflammatory medication and a general feeling of mental dullness from the pain medications. The pain is distracting leading to memory and concentration difficulties. Sexual activity is often the last thing on the person's mind and this causes more stress in relationships. Understandably, these symptoms accompanying chronic pain may lead to feelings of despair, hopelessness, and other symptoms of a major depression.

A recent study by Strunin and Boden (2004) investigated the family consequences of chronic back pain. Patients reported a wide range of limitations on family and social roles including: physical limitation that hampered patients' ability to do household chores, take care of the children, and engage in leisure activities with their spouses. Spouse and children often took over family responsibilities once carried out by the individual with back pain. These changes in the family often lead

to depression and anger among the back pain patients and to stress and strain in family relationships.

Several psychological theories about the development of depression in chronic back pain focus on the issue of control. As discussed previously, chronic back pain can lead to a diminished ability to engage in a variety of activities such as work, recreational pursuits, and interaction with family members and friends. This situation leads to a downward physical and emotional spiral that has been termed "physical and mental deconditioning" (as discussed previously; See Gatchel and Turk, 1999). As the spiral continues the person with chronic back pain feels more and more loss of control over his or her life. The individual ultimately feels totally controlled by the pain leading to a major depression. Once in this depressed state, the person is generally unable to change the situation even if possible solutions to the situation exist.

Depression and Chronic Pain

We first discussed chronic pain leading to depression and we will now cover the idea that depression can predispose a patient to chronic pain. For quite some time, clinical researchers have known that chronic back pain can lead to major depression, as discussed previously (See Worz, 2003 for a review). Newer studies are now looking at how psychological variables such as depression and anxiety may be linked to the onset of a back and other pain problem. For example, Atkinson, Slater, Patterson, Grant, and Garfin (1991), in a systematic study of depressed male Veterans Administration chronic pain patients, found that 42% of patients experienced the onset of depression prior to the onset of pain, whereas 58% experienced depression after the pain began. Polatin et al. (1993) reported that 39% of the chronic low back pain patients they evaluated displayed symptoms of pre-existing depression. More recently, in a review of research studies in this area, Linton (2000) found that in 14 of the 16 reviewed studies, depression was found to have increased the risk for developing back pain problems.

Depression and Spine Surgery

As we have seen, many chronic pain patients will experience clinical depression. In addition, these patients will also be faced with the option of elective surgery in an attempt to help the pain. Having some understanding of the impact of depression on surgery is important. The following will briefly address this issue relative to back pain and spine surgery; however, the conclusions are applicable to other chronic pain states.

Research has clearly demonstrated that non-physical variables such as depression, anxiety, thought patterns, and personality style can impact a spine surgery outcome (See Block, Gatchel, Deardorff & Guyer, 2003 for a review). Unfortunately, it appears that in many cases, having a major depression may not

bode well for the outcome of a spine surgery. For instance, as discussed by Block et al. (2003), spine surgery patients who are clinically depressed pre-operatively may continue to display depressive symptoms post-operatively and these can negatively impact the surgery outcome. Particular symptoms that may impede post-operative recovery include such things as low motivation, sleep disturbance, slower healing time, difficulty with physical rehabilitation and inability to perceive improvements (Block et al, 2003; Deardorff and Reeves, 1997).

Block et al. (2003) discuss that, in looking at the issue of depression and spine surgery outcome it is important to consider whether the individual is experiencing a "reactive depression" or shows a pre-injury history of more chronic depression. A reactive depression is defined as depressive symptoms in response to the chronic back pain and associated problems (loss of work, friends, etc). Reactive depression occurs in back pain patients who have no previous history of depression. However, many chronic back pain patients have a history of problems with depression even before the onset of the back pain. As reviewed previously, individuals with chronic depression may be at greater risk for developing a low back pain condition. It is also likely that this same group is at greater risk for a poorer outcome to spine surgery (Block et al., 2003).

Treating Depression in the Chronic Pain Patient

One of the biggest problems in treating major depression in the patient with chronic pain is missing the diagnosis. This occurs for two reasons: the chronic pain patient often does not realize he or she is also suffering from a major depression and the doctor is not looking for it. Chronic pain patients will often define their problem as strictly medical and related to the pain. This is supported by a recent study, which found that individuals with chronic pain and depression went to their physicians 20% more often than a comparison group of non-depressed medical patients. In addition, depressed chronic back pain patients were 20% less likely to see a mental health specialist than medical patients without a pain problem (Bao, Sturm, & Croghan, 2003).

The depressive symptoms may be downplayed by the chronic pain patient who believes that, "just get rid of this pain and I won't feel depressed" or that acknowledging depression is a sign of weakness in dealing with the pain. When the diagnosis of major depression in the chronic pain patient is missed or ignored, treatments strictly directed at the pain are much more likely to fail. As concluded by Ohayon and Schatzberg (2003), the presence of a chronic pain physical condition increases the duration of depressive mood and chronic pain patients seeking medical consultation should be routinely screened for a major depression.

Treatment of depression associated with chronic pain requires a specialized approach. It is generally accepted that the pain and the depression should be treated simultaneously in a multidisciplinary fashion. The treatment of clinical depression most often includes psychological interventions (e.g., counseling,

relaxation training, etc) and anti-depressant medication. In a recent review of the research from 1980 through 2000 looking at treatment of depression it was found that the combined treatment approach (medication and psychotherapy) yielded better outcomes than either of the interventions alone (Pampallona et al., 2004). Simultaneously treatment directed at the chronic pain is critical. It has been found that chronic pain may interfere with depression improvement and this makes common sense. Treatment for the chronic pain might include such things as physical rehabilitation aimed at restoration of function, trying to "normalize" one's life as much as possible even with the pain, appropriate medication management, among other things. Multidisciplinary treatment of the chronic pain and major depression will ultimately give the patient more of a sense of control over the pain and start a "positive spiral" toward physical and mental re-conditioning.

ANXIETY

In most cases, anxiety about the pain is more likely in the subacute stage while depression prevails with chronification. The subacute phase occurs after the acute phase but before the chronic stage. It usually occurs at about the three- to six-month range. At the acute stage the patient with pain generally feels a reasonable sense of hope that the pain will resolve within the near future. In the subacute phase and at the beginning of the chronic phase, one's thoughts and emotions about the pain begin to change. It is not uncommon for the person to begin to wonder, "Will this pain ever go away?" "This must be something serious," and "I'll never get better." These types of thoughts lead to anxiety. Anxiety can occur at different intensities, all the way from nervousness to full panic attacks.

Symptoms of Anxiety
Muscle tension, including shakiness, jitteriness, trembling, muscle aches, fatigue, restlessness, and inability to relax
Nervous system overactivity, including sweaty palms, heart racing, dry mouth, upset stomach, diarrhea, lump in throat, shortness of breath, and so on
Apprehensive expectations, including anxiety, worry, fear, anticipation of misfortune
Trouble concentrating, including distractibility, insomnia, feeling "on edge," irritability, and impatience.

Although most patients believe that their anxiety will subside "when the pain goes away" the anxiety is very often causing a significant increase in pain perception. This results in a vicious cycle of pain, anxiety, more pain, and more anxiety.

Clinical research has demonstrated that removal of the pain does not necessarily mean emotional issues will also then resolve. For the patient to wait until the chronic pain is gone before addressing emotional issues is a trap that will prevent a return to a normal life.

FEAR AND PHOBIA

Recent research suggests that fear may be a significant component in many types of chronic pain. This fear is usually focused on the fear of further injury, increased pain, or both. This fear is often closely linked with anxiety as discussed in the previous section. Fear in chronic pain is unreasonable when it is either not appropriate to the situation or is beyond what it should be, given the nature of the situation. This might include being fearful of reinjury when there is no indication that this will occur. When fear is at these levels and interferes with normal functioning, it is considered to be a phobia. A phobia is defined as an irrational fear of an object, activity, or situation causing the person to avoid the object, activity, or situation (e.g., movement). A new area of scientific investigation in many types of chronic pain is "kinesophobia", or fear of movement. In our clinical practice we see kinesophobia quite routinely. These patients have guarded, slow, and deliberate movements, as well as extreme cautiousness. This is often due not to the pain but rather to a phobia of injury, reinjury, or acute exacerbation. The following case example illustrates this condition.

Case Example
One case was a forty-two-year-old man who was a very successful lawyer. He had one episode of fairly severe back pain, somewhat localized, which lasted for quite some time. He attributed the onset of the pain to "moving a certain way" while getting out of his car. This had occurred about four months prior to the patient coming to our clinic. In that time he had been seen by several specialists, at least one of whom had recommended spine surgery. The patient came in with extremely slow, almost robot-like movements in an attempt to keep his spine as straight as possible. For fear of making the pain worse, he would not bend. He had developed a very structured ritual in order to get dressed each morning. This included putting his underwear and pants on the floor, stepping into them, and then gradually working them on with the help of a reaching device. He had developed similar rituals for putting his shoes on, driving, working at his desk, and interacting with his children. We ultimately involved him in an aggressive physical-therapy program for reactivation and mobility as well as psychological pain management to address his kinesophobia. We even employed such unusual techniques as having him do a type of obstacle course through the gym with a time clock so that he could not focus on his fear of the pain. There was no medical reason for him to fear the pain or to be a surgical candidate. The patient responded very well to the program with a return to normal activities.

Kinesophobia can cause great problems over the long term. The fear of movement results in the patient attempting to move as little as possible. This guarding behavior causes the muscles to fall into a state of disuse and atrophy. The muscles become weak and tight (shortened) due to lack of use. Any attempt to increase activity will then cause an increase in pain due to the weak and tight muscles. This scares the patient into not doing anything. Working through this period of increased pain under supervision with reassurance is critical to recovery from the pain problem.

Development of the disuse syndrome and physical/mental deconditioning due to fear of injury and pain, the cycle causes more and more pain to occur as can be seen in the Figure.

ANGER

Anger is frequently an integral component of chronic pain problems. It is helpful to explain to patients that anger may be felt and expressed directly or indirectly. We are all familiar with the direct expression of anger. This might include such things as a short temper, irritability, and explosive behavior, among other things. Indirect anger may be expressed in a number of ways. For instance depression has been defined as "anger turned inward" and may in some cases be a type of indirect anger. We often see chronic pain cases where there is no overt anger but

an increase in self-destructive behaviors, such as increased smoking, coffee intake, risk taking, and substance abuse (alcohol and/or medicines). These patterns can indicate indirect anger. Another expression of indirect anger is passive aggressiveness. This is anger expressed outwardly but in a passive, indirect manner. It important to investigate how the patient might be using pain and disability in a passive aggressive manner. An example of this includes an increase in pain (or pain behaviors) in response to someone you are actually angry at. We commonly see this pattern in marital or family relationships. Usually the person with chronic pain who is expressing anger through increased pain does so unintentionally and is not aware of the pattern.

ENTITLEMENT

Another aspect of anger in chronic pain is that of entitlement. This is a term for the feeling that "somebody or something owes me something for the pain that I am experiencing". We often see this sense of entitlement in cases where the chronic pain has started as the result of a work-related injury, car accident, or some other injury. People commonly feel they are "entitled" to a pain-free existence and that any limitation of normal activities due to pain is unacceptable. They feel that if their lives are disrupted or limited in any way due to pain, then "somebody should pay." Although in a legal sense this might in part be accurate, from a psychological perspective this attitude can be very self-destructive. When a patient has excessive focus on what he or she is "entitled to" due to the pain, it will generally prevent him or her from taking responsibility for getting better. When there is litigation involved, the situation becomes even more complex, as we shall see in the next section. Even when there is not litigation involved, human beings will naturally look for a place to "put the blame" for their pain. We do this in an attempt to explain the pain and to express our anger at something. This blaming may be directed at a spouse, doctors who were unable to find a reason for the pain or provide a cure, "the guy who hit me," "the idiot who left a slippery floor for me to fall on," or "God, for putting me in this painful situation." Focusing on blaming is a form of entitlement, and it is not healthy for a recovery from chronic pain. The most important thing to remember about entitlement is that it is a natural response to extended pain and disability; but if it is not adequately addressed and resolved it can completely interfere with recovery.

OTHER FACTORS INFLUENCING PAIN AND SUFFERING

In evaluating chronic pain patients it is important to be aware of other factors that can influence pain, suffering and disability. These primarily involve behavioral factors as originally identified by Fordyce (1988).

Positive Reinforcement of Pain Behavior

Pain behaviors are the behaviors that help us communicate to others around us that we are experiencing pain. These might include such things as talking about

the pain, taking pain medicine, yelling out, grimacing, groaning, moving slowly, and being very silent. It is only by these types of behaviors that others can try to gauge our level of pain experience. Pain is an individual experience that cannot be directly measured, so we use pain behaviors to communicate our distress. Any behavior that we exhibit can be reinforced by those around us. Further, any behavior that is reinforced will increase in frequency (by definition). For example, research studies have shown that if you instruct a classroom of students to pay attention to the teacher each time he moves to the left side of the classroom and ignore him when he is on the right side, after a while he will be teaching the entire class from the left side of the room. Even more interesting is that the teacher will not be aware that this reinforcement of being on the left side of the classroom is even occurring. Other examples of behaviors that are reinforced throughout the day include working for a paycheck, recreational activities, family interactions, and so on. As with any behavior, pain behavior can also be reinforced by the environment around the patient and this most commonly occurs in the family setting. Thus, it is very important for the pain management clinician to get a good understanding of how the family system is responding to the patient's display of pain behaviors. Reinforcement of pain behaviors can be very direct and obvious, such as

• a spouse asking to rub her husband's back when a groan is heard,
• a spouse "knowing" when to bring pain medication even when her husband has not asked simply by knowing "the look on his face," or
• warning the husband/patient not to "overdo it" when the spouse sees him slowly limping past.

These are examples of direct attention (reinforcement) for pain behaviors. Reinforcement can also be quite subtle, as can be seen in the following example given by Dr. Fordyce, the pioneer in this area of pain research:

Case Example
The pain-ridden wife walks across the room without displaying pain and her paper-reading husband does not look up. When she limps, holds her back, or gasps while walking, his attention is diverted to her, and he watches and perhaps makes a solicitous comment.

Dr. Fordyce also gives an extreme but not uncommon example of how powerful direct reinforcement can be in the following example:

Case Example

The patient was a man in his forties who had been incapacitated for nearly twenty years. His wife worked to supplement his disability income. The husband was completely deactivated, spending most of his time in bed watching TV. She would prepare dinner for him in the evenings and bring it to the bedroom. When he would make an attempt to get out of bed to eat in another room or socialize with friends, his wife would chastise him for taking such risks. Her nurturing behavior was actually being reinforced by his decrease in pain behaviors each time she attended to him. In addition, his pain behaviors were continually reinforced by her attention to them. It is similar to parents who indulge a whining child. The indulgent behavior is reinforced by the temporary cessation of the child's whining while the whining is reinforced over the long term by continued attention from the parents.

Direct reinforcement of pain behaviors can increase both disability and suffering, which in turn increases one's perception of pain. It is important to note that direct reinforcement of pain behaviors (as with the other influences to be discussed subsequently) are most likely to have influences in the chronic pain stages, after most tissue healing has occurred. This is usually considered to be important four to six months after the onset of pain consistent with Gatchel's model of transitioning from acute to chronic pain.

Avoidance Learning

Behavior can also be influenced by what has been termed avoidance learning. This is behavior that we engage in to "avoid" consequences that are negative or aversive. In this way, those behaviors are actually being reinforced. Avoidance learning can also influence pain behaviors. In this scenario certain behaviors will be reinforced in an attempt to avoid the pain. Dr. Fordyce gives the following examples:

Avoidance Learning Examples

A certain limp or posture is found to be effective in being more comfortable and to avoid the pain. Thus, it is reinforced each time it is rehearsed and becomes part of the person's usual behavior.

Bed rest is found to decrease the pain. Thus in order to avoid any pain, the person spends more and more time in bed. Any time an increase in activity is attempted, the pain increases more and more due to weakening of muscles and other factors. Attempts at becoming more active are *punished* by

increased pain, and bed rest is *reinforced* by avoidance learning.

A patient may know that walking more than three hundred yards has resulted in increased pain in the past. Therefore whenever this goal is approached, the expectation for increased pain occurs. The patient will then avoid coming near the three-hundred-yard mark in the walking program.

Early in the history of a pain problem a limp is reinforced by avoiding pain, as in the above example. After some time the limp itself leads to reinforcing from family members and others (e.g., "Let me help you," "I'll take care of that," and "Don't walk all that way, I'll drive you," etc.). At this point in time, it may not be necessary for pain to occur for the person to limp. It is an independent behavior in and of itself.

These examples illustrate in simple terms what is actually a complex and subtle process. Another area that has received great attention in research recently is avoidance learning as it relates to job dissatisfaction and lack of recovery from back pain. In the Boeing Study, researchers at the University of Washington found that one of the strongest predictors of whether a worker would have prolonged back injury disability was job dissatisfaction. One would think it might be something like heavy work, bending, problems with one's spine, or some other "physical" explanation. This was not the case. It is important to underscore the fact that the person experiencing the pain, as well as his or her family members, is usually completely unaware of these influences of reinforcement and avoidance learning.

Reinforcement by the Medical Community

Dr. Fordyce also points out that the medical community can actually foster pain behavior and disability in the following ways:

- Attention from physicians or other health care providers.
- The use of pain medications.
- The restriction of exercise and activity

The first of these factors is fairly straightforward. It simply includes the attention that one receives from the medical community when seeking treatment for a chronic pain problem. We have treated many chronic pain patients who clearly obtain a type of nurturance from their relationships with various aspects of the medical community. This might include such things as seeing the physical therapist a few times per week for hot packs and massage, visiting the doctor on a frequent basis, or going into the hospital occasionally for management of a pain "flare-up." We will often see this pattern of reinforcement in patients who have very few other areas of reinforcement. An example of this might be the person who has lost his job due to pain and has few supportive family relationships and

no recreational interests. In this scenario, the pain problem and its treatment is virtually the center of the person's life.

The use of pain medications can be a powerful reinforcer for pain behavior. Pain medications are often prescribed on a "pm" (as needed) basis. Under this prescription, pain medications are given when the person is experiencing pain (showing pain behaviors) and are not given when there are no pain behaviors. This method would appear to make common sense, but it can actually set up strong influences over pain behavior. Pain medication provides pain relief as well as an improved sense of emotional well-being. This improved sense of well-being might include such things as relief from anxiety, a general sense of relaxation, or improved energy and sleep in the person who is depressed. Given the fact that pain medicine can be very reinforcing, pain behaviors can quickly come under their influence. This occurs because the person must usually demonstrate pain behaviors in order to justify the request for pain medicines. The pain medicines are then taken which in turn reinforce the pain behaviors. As the pain becomes more chronic, the likelihood of pain behaviors being reinforced by pain medicine use becomes greater and greater. Physicians will often play a role in this process as apparent solutions to the pain problem become fewer and fewer. A common response by the chronic pain patient is to "Do something!" which unfortunately often results in the physician throwing more pain medications at the problem.

The medical community can also inadvertently reinforce chronic pain behaviors in how it manages bed rest and activity. For instance, in treating musculoskeletal and other chronic pain problems, the prescription for extended bed rest is common. This is often followed by the admonition to "let the pain be your guide" in terms of activity. In the majority of cases, the pain becomes more chronic and this type of approach will actually make the entire problem worse, not better. This medical advice simply reinforces the entire sick role in both the patient and those around him or her. It also creates much of the unnecessary disability we see with chronic pain sufferers.

Difficulty Coping with Being Well

As Dr. M. Scott Peck has stated so eloquently and succinctly in his book, The Road Less Traveled, "Life is difficult." In some cases of chronic pain, the multidisciplinary assessment will reveal that part of the pain problem relates to the patient not being able to cope with being well. This is not a conscious decision on the part of the patient. Rather the stress of coping with being well is more negative than focusing on the chronic pain and being in the sick role. Thus the chronic pain actually shelters the patient from stress, responsibility demands, and other aspects of normal everyday life. In these cases it is important to assess the "cost" (in psychological, physical, and emotional terms) for the person to actually get better. The following example will help illustrate this point:

Mr. T. was a fifty-three-year-old railroad conductor who injured his back while attempting to throw a large railroad track switch. He had been through the usual course of physical therapy, but his back pain continued. He had an MRI that revealed a slight disc bulge, but the doctors did not think these findings accounted for his level of pain. He had been disabled from work for approximately twelve months at the time of our assessment. As with the previous doctors the physical evaluation revealed little that would account for his pain. However, the psychological evaluation revealed several things that helped explain his pain. First, he had been experiencing more and more stress in the work setting just prior to the injury. He had a new boss who was constantly "on" him. The patient was very concerned about his ability to do the job given his age and the number of younger people who were ready to take his place. He feared his new boss was trying to "get rid of" him. In addition the railroad disability program allowed him to collect 80 percent of his full pay while he was disabled. He might also be eligible for early medical retirement or retraining if the back pain did not resolve.

This example clearly indicates that the "cost" for this patient to get better was to return to a job that was becoming more and more stressful, return to a job he might be fired from, lose the possibility of retraining, and give up 80 percent of his pay for being in a less stressful (albeit painful) situation. It should be clearly understood that this situation does not show malingering or faking. It is just a situation of many pressures operating on this person's chronic pain problem. The pain situation protected him from another situation that for him was even worse. Another less extreme example is as follows:

Sharon is a thirty-year-old woman who has been rather "sickly" since childhood. She had back pain that seemed to "come out of nowhere" and had been with her for the past two years. She had been through a variety of evaluation and treatment approaches, which were of little help. She would consistently report some relief at the beginning of treatment, but the pain would eventually return to its usual levels. Our evaluation revealed that Sharon had a very inconsistent work history, a history of a number of failed relationships, and little in the way of social involvement. The last two years had been almost entirely focused on her back pain problem in terms of going to doctors, therapists, and other healers. It was clear that the back pain was helping to distract her from other very stressful aspects of her life and sheltering her from the demands of normal functioning. The cost for

her to become well would have been very great without help in other areas of her life. Although she was very depressed and anxious in her chronic back pain problem the other prospects were certainly no better. Until she was able to focus on these issues, her back pain would not resolve.

PART II - ASSESSMENT

The previous section reviewed current theories of pain, the chronic pain syndrome, and factors that influence a patient's perception of pain and suffering. This section will review the "targets" of evaluation such as the patient and various environments (family, the healthcare system, sociocultural). These targets are evaluated across domains of biologic, affective, cognitive and behavioral. The course will also review methods of assessment such as the clinical interview, pain and psychological testing, and observational data. It is beyond the scope and focus of this course to review all of the medical diagnostic tests for pain. This course will focus on the assessing the chronic pain patient who has already completed all of the medical testing and completed all of the usual treatments (e.g. most interventional techniques, surgery, etc.). This course focuses on the assessment of the chronic benign or non-cancer pain patient. After the multifactorial evaluation is completed, a treatment plan is developed and implemented. Whether or not the QME has the ultimate determination in treatment decisions (now under UR and IMR), knowing the appropriate treatments will help the evaluator accurately determine whether Permanent and Stationary status has been reached (on not). If the patient is not MMI, treatment can be recommended.

 As discussed by Turk and Monarch (2002) chronic pain should be assessed from a biopsychosocial perspective. This is consistent with the gate control model of pain and the pain system model discussed in Section I. The biopsychosocial perspective takes into account biologic, affective, cognitive, behavioral, and sociocultural influences on pain. The clinical health psychology assessment model developed by Belar and Deardorff (1995, 2008) is useful in completing a biopsychosocial assessment of chronic pain. The following is adapted from Belar and Deardorff, *Clinical Health Psychology in Medical Settings, Second Edition* (APA Books, Washington D.C., 2008).

TARGETS OF ASSESSMENT

In biopsychosocial assessment of chronic pain, there are various "targets" of assessment that should be addressed. The target groups form a 4 X 4 assessment grid (domain of information by unit of assessment). The domains of information include biologic or physical, affective, cognitive, or behavioral. The units of assessment include patient, family, health care system, and sociocultural context. The following table shows some examples of the kinds of information that might be collected. For a more detailed example, see Belar and Deardorff (1995, 2008).

Environments				
	Patient	Family	Healthcare System	Sociocultural
Biologic	age, race, sex, physical appearance, symptoms, health, vital signs, lab data, medications, genetics	home setting, economics, family size, family illness	Treatment setting, medical procedures, prosthetics	Social services, financial issues, social networks, occupational, health hazards
Affective	mood, affect, feelings about treatment and other aspects of chronic pain, history of affective disorder	family feelings about patient, illness, and treatment	providers' feelings about patient, illness, and treatment	sentiment of the culture about patient, illness, and treatment
Cognitive	cognitive style, thought content, intelligence, education	knowledge about illness, attitudes and expectations	provider knowledge, provider attitudes	current state of knowledge, cultural attitude
Behavioral	activity level, interactions with others	involvement in care	provider skills, education, and training	employer, laws, customs

Each block also has an associated developmental or historical perspective that could be critical to a full understanding of the patient's present condition. In each area, the clinician should attempt to understand the patient's (a) current status, (b) changes since onset of the pain, and (c) past history. The focus of the assessment should not be based solely on identification of problems but also on delineation of assets, resources, and strengths of the patient and his or her environment.

Patient Targets

The patient targets of assessment include biological, affective, cognitive, and behavioral. In many ways, these targets of assessment coincide with the "layers" of the pain system model (e.g., nociceptive input, pain sensation, cognitive, affective, pain behaviors, psychosocial environment, etc).

Biological Targets

The most obvious biological targets are the patient's age, race, sex, and physical appearance. In addition, the clinician needs to gain a thorough understanding of the patient's current pain and other physiological symptoms and how they are similar or different from past symptoms. Recent changes in the pain condition or

treatment are particularly salient to the assessment, because they are often the precipitating events that elicit the referral (e.g., increased pain, decreased function, contemplation of surgery, etc.). The clinician will want to obtain information on the specifics of the pain problem: nature, location, and frequency of symptoms; current treatment regimen; and general health status or other medical problems. Other sources of biological information include the physical exam, current and past vital signs, results from relevant laboratory tests, medications, and use of illicit drugs. Furthermore, a history of the patient's constitution and general health including previous illnesses, relevant genetic information, injuries, and surgeries should be obtained. Depending on the type of pain problem, biological targets might also include variables associated with the autonomic nervous system or musculoskeletal activity (e.g., electromyographic [EMG] recordings or peripheral temperature readings) obtained in both resting and stress related conditions. For example, a psychophysiological profile involving lumbar paraspinal EMG activity under relaxed and stressed conditions, in addition to various postures, could be obtained on a patient suffering from chronic low back pain. As will be discussed subsequently, the use of a pain questionnaire and pain diary can be very helpful in assessing the biological and other targets.

Affective Targets

The assessment of affective targets involves understanding the patient's current mood and affect, including their contextual elements and historical features. In addition, an assessment would be incomplete without having obtained information about the patient's feelings about his or her pain problems, treatment, health care providers, future, social support network, and, of course, self. Again, it is helpful to obtain data that allow for comparison between current affective states and those of the past, in that it is often the contrast that has prompted the referral.

Cognitive Targets

Assessment of the patient's cognitive functioning involves gathering information about the patient's knowledge, perceptions, and attitudes, as well as the content and pattern of thinking. It is imperative that the clinician be aware of cognitive abilities and limitations of the patient, from both current and developmental perspectives. Cognitive targets include the following: general intelligence; educational level; specific knowledge concerning the pain problem and treatment; attitudes toward health, illness, and health care providers; perceived threat of illness; perceived control over psychological and physical symptoms; perception of costs and benefits of possible treatment regimens; and expectations about future outcome. Another important target is the perceived meaning of the chronic pain problem (and resulting loss of function) to the patient. The clinician should be aware of the patient's general cognitive style and philosophy of life, including religious beliefs. Assessment of the patient's religious and spiritual beliefs is an area of assessment and intervention that is very often neglected. Research

indicates this one of the most important areas to patients but the least often addressed by health care providers (See Deardorff and Reeves 1997 for a review).

Behavioral Targets

Behavioral targets include what the patient is doing (the action) and the manner in which he or she does it (the style). In assessing pain behaviors, the following actions are often evaluated:

- talking or complaining about the pain
- grimacing, moaning, crying, limping, moving slowly
- taking pain medicine, rubbing a painful area
- using assistive devices such as a cane, walking, brace, etc
- moving more slowly, asking for help, lying down
- avoidance of certain activities, seeking further treatment

The style of behavior can also be evaluated such as flamboyant, hesitant, age appropriate, hostile, restless, and passive. The pain management clinician will want to understand the patient's overall level, pattern, and style of activity in areas of self-care and interpersonal, occupational, and recreational functioning, as well as specific behavioral targets related to the reason for referral. Other important behavioral targets in chronic pain include medication seeking, exercise, activities of daily living (ADL's), sexual functioning, compliance with treatment regimens, etc.

Of special interest is the patterning and nature of the physician-patient relationship, as well as whether the patient senses any type of control over the pain problem. Once again, a historical perspective is important, because past behavior is often the best predictor of future behavior.

Extremely important in chronic pain is the assessment of current and previous health habits (e.g., smoking, exercise, eating patterns, and alcohol usage) and health care utilization. The clinician should be able to answer the following questions about the patient: (a) What are the nature, frequency, and pattern of past contacts with health service providers, and (b) what have been the antecedent stimuli and consequences of these contacts (i.e., history of previous help-seeking and treatments)?

Finally, an assessment would be incomplete without information concerning the patient's current and past history of compliance or adherence to treatment regimens, with specific reasons noted for noncompliance whenever it has occurred. Areas of assessment here include medication usage as prescribed, history of keeping appointments, and follow-through on previous recommendations.

Environmental Targets

The pain management clinician also needs to assess aspects of the various environments within which the chronic pain patient interacts. These include the following: (a) the family unit, (b) the health care system with its various settings and providers, and (c) the sociocultural environment, including social network, occupational setting, and aspects related to ethnicity and cultural background. As with assessment of the individual patient, environmental targets of assessment include physical, affective, cognitive, and behavioral domains, with a focus on relevant demands, limitations, and supports.

Family environment. In assessing the physical domain of the family environment, it is important to know about available economic resources and perhaps even physical characteristics of the home setting, depending on the problem being assessed (e.g., chronic low back pain). The family's developmental history, size, and experience of recent changes are all important aspects to consider. The clinician should also be aware of other illnesses and pain problems in family members and familial models for various symptoms (e.g., a parent who has been disabled due to chronic pain, etc).

In the affective domain, it is important to understand family members' feelings about the patient, the patient's pain problem, and the treatments rendered. Assessment of past or present affective disorders in the family is essential.

In the cognitive domain, the clinician must assess the family's attitudes, perceptions, and expectations about the patient, the patient's pain problem and treatment, and the future. Family members' intellectual resources, as well as knowledge that they possess about health and the pain problem, should be understood.

In the behavioral domain, the clinician will want to know whether there have been any changes within the family since the onset of the chronic pain problem. An example might include a shift in roles and responsibilities of family members due to the chronic pain patient's lack of ability to function (e.g., at home and at work). It is also important to find out to what degree family members participate in the patient's care. As discussed under the pain system model in Course I, reinforcement contingencies can have a powerful effect on pain behavior. The clinician should investigate how the patient's pain and illness behaviors are being reinforced by the family members to the exclusion of wellness behaviors. Pain behaviors might be positively reinforced (e.g., nurturing and "supportive" help for the patient) and negatively reinforced (e.g., removing the patient from stressful responsibility demands, family members taking over the household chores and ADL's, etc). Consider the following example based on an actual case referred for psychological pain assessment:

Case Example

Mr. Smith had been disabled from his job for one year after a low back work injury. The patient had undergone a variety of diagnostic tests and these had not identified likely pain generators. Although the patient complained of extreme pain, the physical findings simply did not explain his level of suffering and disability. Prior to his injury, he had been working two jobs to support the family, neither of which he enjoyed. After the injury, he was receiving disability payments and his wife had returned to work to help support the family. Mr. Smith spent virtually all of his time at home, in bed. Mr. Smith was on a significant amount of pain medicine and his doctor was able to get the insurance company to buy Mr. Smith a hospital bed for his home. The family put the bed in the living room so that Mr. Smith could interact more with his children, who were very helpful in taking care of him. So far, a myriad of physical treatments had provided no relief.

As can be seen, assessment of behaviors of family members that could influence the patient's pain behavior or physical adaptation is crucial. For example, families might model chronic pain behavior, punish patient attempts at self-help, or be secretive in a manner that increases patient anxiety.

Health care system. The health care system should also be assessed across physical, affective, cognitive, and behavioral domains. For example, in the first domain the clinician needs to know the physical characteristics of the setting in which the patient is being assessed or treated (e.g., chronic pain program, surgeon's practice, multiple doctors). In addition, the pain management clinician must understand the physical characteristics of the diagnostic procedures and the treatment regimen to which the patient has been, is being, or will be exposed. This is why it is important for the clinician to be familiar with the type of chronic pain problem that is being treated. As an example, anyone who works with spinal disorders and resulting pain problems should be familiar with the common diagnostic tests (e.g., MRI, CT, CT-myleogram, discogram, bone scan, EMG, NCS, etc.) and common medical treatments (e.g., physical therapy, medications, epidural and nerve root blocks, and the various spine surgeries).

In the affective domain, one must be aware of how health care providers feel about the patient and about the patient's chronic pain problem. Also, the attitudes of providers themselves toward the health care system within which they work can enhance or detract from overall health care. Chronic pain patients who are on disability and not showing any significant response to various medical treatments can become frustrating to healthcare providers who are continuing with a strictly medical model approach (e.g., medications, surgery, physical modalities). After awhile, one might see a certain passive-aggressiveness by the healthcare providers towards the patient as frustration mounts. Of course, the symptoms of

the chronic pain patient will often worsen due to attempts to "prove" the severity of their ongoing symptoms and need for treatment.

In the cognitive domain, the clinician needs to have some understanding of how knowledgeable health care providers are about the patient's pain problem and treatment. As discussed in Section I, in the medical community one often observes that all pain problems are treated as if they are "acute". Of course, this is not the appropriate intervention for chronic pain problems. One needs to assess healthcare providers' attitudes and expectations about these issues as well as about the patient's future. Furthermore, it is helpful to be aware of the community standard of care for the problem. When assessing the "behavior" of the overall health care system, the clinician needs to be aware of policies, rules, and regulations that will affect the patient and his or her treatment (e.g., staffing patterns at the treatment center, appointment schedules, medication refill policies). It is also important to understand which specific behaviors health care providers might be displaying that could influence patient behavior. An example of such behaviors might be transmitting information about the pain problem. I have heard countless stories of chronic back pain patients being told by their physician that, "you have the spine of an 80 year old". Of course, this type of information significantly impacts the patient's belief system and expectations regarding future recovery (or lack thereof).

Sociocultural environment. Physical aspects of the patient's sociocultural environment include both (a) the physical requirements and flexibilities of the patient's occupational and work setting and (b) the social and financial resources-services available to the patient. In addition, the clinician should be aware of the nature of the patient's social network (including size, density, and proximity) and the frequency of the patient's contact with it. This is an extremely important area of assessment in chronic pain. It is not uncommon for a chronic pain patient to be referred for psychological pain management near the end of the treatment cycle. By that time the patient has often been on disability from work for quite some time, is in financial trouble, and is almost completely isolated from previous social support networks outside of the home. All of these factors act as significant barriers to recovery.

In the affective and cognitive domains the clinician should understand cultural sentiments, attitudes and expectations as impacted by the patient's race, gender, ethnicity, lifestyle, religion, pain problem, and treatment (e.g., sentiments about a chronic pain problem and disability in a person who was previously the primary breadwinner of the household). The clinician should be able to answer the following questions: What are the cultural attitudes towards the pain problem and disability? What is the health belief model of the culture itself? Are there prevalent religious beliefs that could impact the patient's willingness to obtain treatment?

In terms of the behavior of large sociocultural systems the clinician might need to know specific employment policies related to the pain problem being assessed

(e.g., regulations regarding return to work for patients with back problems). In addition, legislation regulating health care provision and health habits is relevant (e.g., The Americans with Disability Act, state Workers Compensation Laws, etc.) Finally, the clinician should be aware of ethnic customs that could be related to symptom reporting (or underreporting) and health care use.

INTEGRATING ASSESSMENT INFORMATION

It becomes clear from a review of the targets for assessment that these "blocks" are interrelated and that the nature or relative importance of information obtained in one block is often affected by information found in another.

Purpose of the Assessment: Treating versus Forensic Evaluation		
A QME, AME or IME evaluation is different from that of a treating healthcare provider. A treating practitioner appropriately trusts his or her patient and there is no reason to do otherwise. However, in the forensic arena, the purpose and method of evaluation is quite different. The following are some of the primary differences between a treatment and forensic evaluations (adapted from Greenburg and Shuman, 1997).		
Issue	**Treating Evaluation**	**Forensic Evaluation**
Who is the client?	Patient	Attorney and/or court
What are the goals of assessment?	Provide treatment and support	Objectively evaluate the applicant
What is the primary source of data?	Accept what the patient says	Corroborate or refute examinee's statements with collateral information and objective data
What is the emphasis?	Treating and "helping"	Assessment of medical-legal issues at stake

What are the trust issues?	Assume basic honesty of the patient	Do not blindly trust any source
What are accountability issues?	Anticipate little challenge to conclusion, diagnosis	Anticipate cross-examination, consider alternative hypotheses, explanations
Who holds the privilege?	Patient	Information available to attorneys and defendants
What knowledge of legal issues is required?	May be aware of legal standards, rules of evidence	Familiar with labor laws and WC guidelines governing issues to be addressed
What is the attitude towards interacting with the legal system?	Avoid depositions and court appearances	Accept legal proceedings including depositions as part of the work

Integrating assessment information is critical in the evaluation of a chronic pain patient. It is also critical to gather accurate information across as many "blocks" of assessment information as possible. Patient self-report and questionnaires are only two data sources and the information may or may not be entirely accurate. For instance, patients often do not know the medical diagnosis for their pain problem, do not remember or know the details of their medication regimen, do not understand the surgeries they are facing (or have undergone), etc. In addition, a patient may be reluctant to discuss a past history of medication abuse but this information would likely be available elsewhere. Of course, the results of any psychological testing would be impacted by such things as medication use, level of concentration, substance abuse, and the ability to tolerate the pain and maintain focus while taking a lengthy test such as the MMPI-2. As can be seen, information gathered across assessment blocks should be compared and contrasted to determine consistencies and inconsistencies.

In conducting an assessment, it is important to understand that the data obtained could be influenced by the type of setting in which the assessment occurs. For example, low-back-pain patients often walk with greater or lesser flexibility

depending on who is watching them and in what setting they are being observed. The evaluator should be collecting all observational data that is available (examples might include: the patient walking from the parking lot to the office, the patient sitting in the waiting room, the patient interacting with staff, etc). Consider the following example:

Case Example
A low-back-pain patient in an inpatient, chronic pain program was repeatedly observed ambulating with a walker by program personnel. However, on one occasion, when the patient was unaware that he was being observed, he was seen casually carrying his walker over his shoulder while ambulating with appropriate body posture and gait.

Patient expectations about the purpose of the assessment clearly impact the data obtained. As example, the demand characteristics for patients seeking a spine surgery that he or she believes will "cure" the pain will clearly impact how the pain evaluation is approached. When evaluating a chronic pain patient it is imperative to take into account the reason for the evaluation (e.g. forensic). Various evaluation purposes might include:

- To determine appropriateness for psychological pain management treatment
- As part of a psychological screening for surgery
- To determine disability status related to the chronic pain
- To determine pain issues related to some type of litigation (W/C)

The patient who is undergoing a pain evaluation in pursuit of treatment will likely respond very differently from the one that is being assessed for disability or litigation issues.

The presence of other people, their roles, and their behavior can affect responses during assessment. The following are more examples of relationships that influence the interpretation of information obtained during assessment:

Interpretation of Assessment Information
Medication effects on psychological testing results and psychophysiological recordings (e.g., diazepam on EMG level)

Fund of knowledge of the physician on accuracy of medical diagnosis (often specialists need to be consulted to evaluate medical record data, as the referral may come from a general practitioner who had not completely evaluated the presenting problem)

Family understanding, emotional support, and involvement in treatment on compliance with medical regimen

Family members' behavior relative to self-care activities (e.g., overprotectiveness often impedes the pain patient's attempts at self-management and, consequently, hinders the development of a sense of mastery)

Legislation on sick-role behavior (e.g., disability payments could reinforce chronic pain behavior)

Religious beliefs on the perceived meaning of symptoms and acceptance of medical regimens (e.g., pain as guilt for past sins)

Providers' attitudes about the effect of the chronic pain on the patient's affective responses

Family attitudes towards the chronic pain (e.g., support, solicitousness, punishment) and its effect on the patients' affective and behavioral responses

Characteristics of the environment on patient activity level (e.g., chronic pain patients who use a cane, walker, wheelchair, etc)

Occupational requirements on self-esteem (e.g., loss of breadwinning capacity due to chronic pain after an industrial injury)

Providers' attitudes toward treatments on patient suffering (e.g., negative attitudes about use of narcotics resulting in under-medication of pain)
Cognitive factors related to chronic pain, depression and anxiety, and medications (e.g., memory, concentration, etc)

Cognitive factors on physical symptoms (e.g., perceived control of pain results in increased tolerance for pain)

METHODS OF ASSESSMENT

In performing the chronic pain evaluation, there are numerous methods that can be used. Many of these give information about one or more targets in the assessment model. The choice of methods depends on the target being assessed, the purpose of the assessment, and the skill of the clinician.

There are probably as many different approaches to the evaluation of chronic pain as there are clinicians involved in this field. It is not so much the individual methods used as long as the important targets of assessments are addressed in a valid manner. The issue of validity will be discussed in great detail subsequently. The critical issue is that any testing results, mental status examination, or other data must be interpreted within the context of the chronic pain problem and symptoms.

One should not be wedded to any one particular technique, as each has its strengths and weaknesses. However, it is safe to say that a good clinical interview is the core assessment method. Belar and Deardorff (1995, 2008) endorse a multiple-measurement model and a convergent-divergent, hypothesis-testing approach to clinical assessment. A detailed description of all the specific methods available to assess the chronic pain patient is beyond the scope of this presentation. The following is an approach that I have found useful and is similar to what other clinicians in the field might do. The Suggested Resources at the end of the online course provides excellent references for further study in this area. The methods of assessment discussed are interview, questionnaires, diaries, psychometrics, observation, and archival data.

THE CLINICAL INTERVIEW

The clinical interview is perhaps the most common method of gathering information. It has the capacity to elicit current and historical data across all domains (i.e., physical, affective, cognitive, and behavioral information regarding the patient and his or her family, health care, and sociocultural environments). The interview is also a means of developing a supportive evaluation relationship with the patient. It permits the acquisition of self-report and observational data from the patient, family members, significant others, employers, and health care providers. Understanding one's own stimulus value is crucial to the interpretation of interview data.

Content and style of individual interviews vary depending on the assessment question and purpose. The formality of the interview process (unstructured, semistructured, or structured) often depends on the personal preference of the clinician as well as the setting and time constraints. Specific intervention programs (e.g., a chronic pain rehabilitation program) commonly use structured interviews. Probably the best approach is a combination of the structured and unstructured

interview approaches. This helps to avoid interviewer bias and to remain open to exploring areas not immediately recognized as important.

In most situations, it is most useful to develop one's own structured/semi-structured interview for a specific pain patient population (especially if you are specializing in one chronic pain group over another). For instance, if you find yourself working with mostly spinal pain problems you might develop an interview specific to that patient population. Although there will be a great deal of overlap, structured interviews for other pain problems (e.g., complex regional pain syndrome, craniofacial pain, neuropathies, pelvic pain, etc) might be slightly different.

Elements of the Clinical Interview

Elements of the clinical interview often include the pain and medical history, psychosocial histories (family, work, educational), current psychosocial status, and the mental status examination (MSE). Not every clinical interview will assess all categories outlined previously but there should be certain common components to every clinical interview. For instance, every clinical interview should include some elements of the Mental Status Examination (MSE). The extensiveness of the MSE will depend on the presenting symptoms and preliminary findings. Elements of the MSE should include at least the following sections:

(1) Appearance, Attitude, and Activity
(2) Mood and Affect
(3) Speech and Language
(4) Thought Process, Thought Content, and Perception
(5) Cognition
(6) Insight and Judgment
(7) Physical examination (if appropriate to the discipline)

The MSE commonly yields information that has not been previously assessed. Many of the areas of assessment (e.g., sexual functioning, drug- and medication-use history, and suicidality) are uncomfortable areas for other providers to explore, but they are of great concern to the patient. For instance, in asking about the impact of a pain problem on sexual functioning, the following response is not uncommon, "I am glad someone finally asked me about that! I've been very concerned. . . ." An excellent mental status exam resource is, The Psychiatric Mental Status Examination (Trzepacz & Baker, 1993). There are also many MSE structured formats available.

QUESTIONNAIRES

Clinician developed, problem focused, information gathering questionnaires are very useful in the assessment of a chronic pain problem. Depending upon the purpose of the interview, the questionnaire may be mailed to the patient before

the first visit and reviewed at the time of interview. This method is a considerable time-saver in the evaluation of chronic pain patients since the amount of information that needs to be gathered from the patient tends to be quite extensive. Chronic pain patients also appreciate the ability to fill these questionnaires out at home since sitting tolerance and endurance is often an issue (precluding having the patient complete the forms in the waiting room at the time of the interview). Of course, if the purpose of the evaluation is related to disability or is medical-legal, some the questionnaires can be mailed (e.g. demographic, history), but others should be done in the office environment (any objective test that is scored – to ensure that the patient actually completes it, and not someone else). The interviewer may review questionnaire data with the patient but can focus more time on areas needing further clarification and on more general issues. Reviewing some questionnaire information with the patient is important since it demonstrates the value of the data to the clinician and helps to establish rapport. Questionnaires can also be developed for significant others and health care providers. The form and content of the questionnaire will depend, of course, on the theoretical orientation of the clinician. Questions can be forced choice, open ended, simple ratings, checklists, or pictorial in nature (e.g., pain maps). Clarity and ease of response are important features.

Pain Ratings and Drawing

Some aspects of the pain questionnaire merit further discussion. For instance, if a patient rates his or her pain as a 10 at its lowest, usual and highest intensity, he or she is either making a cry for help or cannot distinguish between variations in pain intensity. This is also true for someone who rates his or her pain at an 8 at its lowest intensity. All pain perception is variable over time and it important that patients be able to make subtle distinctions in intensity. This is often one of the treatment goals of chronic pain management.

The pain drawing can also be a very significant source of information that can be assessed very rapidly. As discussed by Block et al. (2003), "The pain drawing allows the clinical not only to rapidly visualize the areas in which the patient is experiencing, but also to assess certain aspects of the patient's perception of pain" (p. 49). A number of scoring systems have been developed for pain drawings (See Block et al., 2003) and these are designed to identify drawings that are "abnormal" or indicative of pain not due to physical factors or nociceptive input. Penalty points (indicating more abnormality of the drawing) are scored in three domains: poor anatomic localization, pain expansion or magnification, and explanatory notes or other features added to the drawing not requested in the instructions. Pain drawing scoring systems are more often used in research and are not typically used in clinical practice. However, when a drawing is grossly abnormal, a scoring system is not necessary (as can be seen in the examples). Pain drawings are simple to use and can provide a wealth of information.
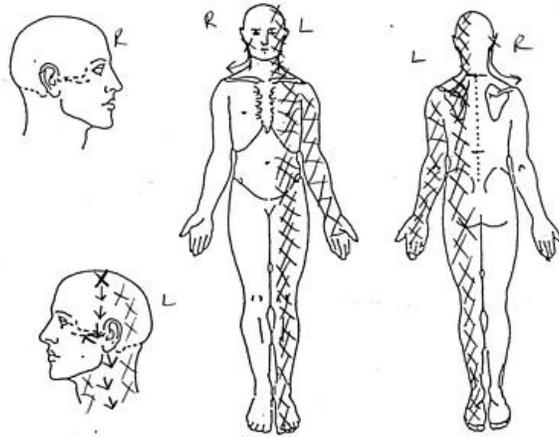
Pain drawing #1. The first pain drawing is considered abnormal since the symptoms do not follow anatomic distribution and the pattern is vague and diffuse. This drawing would meet two of the penalty point domains: poor anatomic localization and pain expansion. In this patient, after extensive objective testing, there were no factors identified that would explain this pattern of pain. The possibility of a conversion disorder was considered.
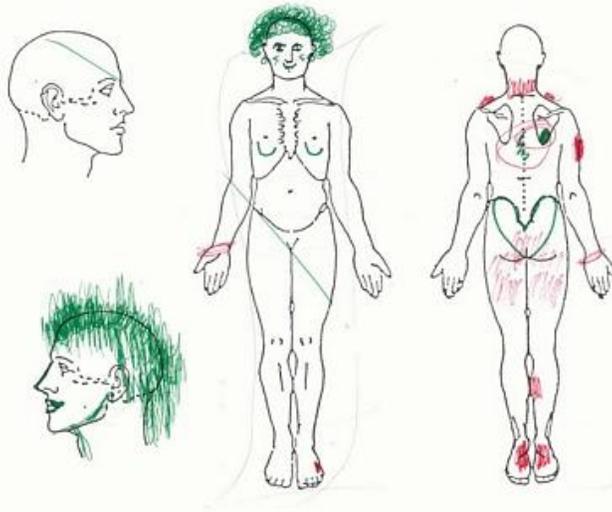
Pain drawing #2. The second pain drawing was considered abnormal since it met three of the penalty point domains: poor anatomic localization, pain expansion, and adding features or explanatory notes. The drawing also shows pain outside the body. Again, there were no objective findings that would explain these pain and symptom distributions.
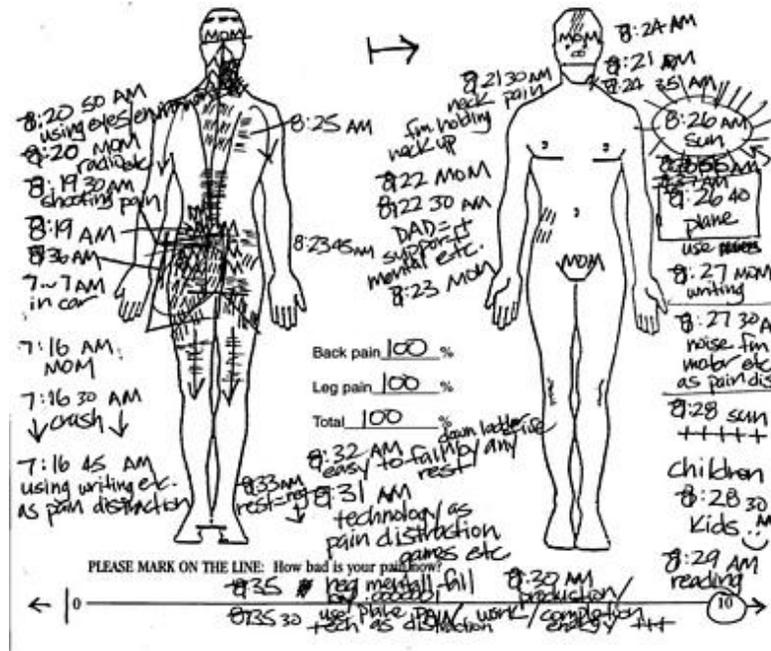
Pain drawing #3. This pain drawing is probably the most fascinating I have come across in practice. This was a 23 year old male who was referred for a pre-surgical screening prior to a proposed spinal fusion. The pre-surgical screening was completed and the patient was not cleared due to biopsychosocial factors. It was also clear during the clinical interview that the patient was showing insidious onset of psychotic features (delusions, paranoia, disorganized speech, etc.) that would wax and wane. The patient had no history of psychiatric treatment or reported symptoms and his surgeons had simply referred him for routine screening. The patient was ultimately hospitalized on a psychiatric basis and began appropriate treatment after receiving a diagnosis of schizophrenia. Although he did have some objective findings relative to the pain symptoms, there was symptom amplification due to the psychological issues and spine surgery was determined not to be indicated. I think this case also underscores that, although the pain practitioner will primarily be involved with more behavioral health related issues, it is important for the clinician to be able to assess and appropriately manage these types of unusual psychiatric situations.

PSYCHOMETRIC TESTING

In general, two kinds of psychometric techniques are used in the assessment of chronic pain problems: general tests that are adapted for use in this population (e.g., MMPI-2, BDI-2) and tests constructed specifically for use with medical/pain patients (e.g., BHI-2, MPI). To get even more specific, there are also tests developed just for specific pain problems. For this overview discussion, tests designed for specific pain disorders will not be reviewed.

Purpose of Forensic Assessment: Establishing Credibility

Forensic evaluation of the chronic pain patient is not uncommon given the fact that the pain often starts with an injury. As discussed in the AMA Impairment Guides (Chapter 18), "It is considerably more difficult to provide a method for assessing chronic, persistent pain than acute pain. In chronic pain states, there is often no demonstrable active disease or unhealed injury, and the autonomic changes that accompany acute pain, even in the anesthetized individual, are typically absent" (p. 566). The Guides go on to state that, "Pain is subjective. Its presence cannot be readily validated or objectively measured" (p. 566). As such, the evaluation of the chronic pain patient relies primarily on self-report data. The rating of impairment due to chronic pain "differs significantly from the conventional rating system, which relies primarily on objective indices of organ dysfunction or failure" (p. 573). According to the AMA Guides (p. 573), pain-related impairment is considered <u>unratable</u> if:

- His or her behavior during the evaluation raises significant issues of credibility

- He or she has clinical findings atypical of a well-accepted medical condition

- He or she is diagnosed with a condition that is vague or controversial

This reliance on subjective, self-report data underscores the absolute necessity for establishing patient credibility. Establishing credibility of the patient self-report should include any or all of the following:

- Standardized tests to rule out malingering and deception

- Assessing consistency or inconsistency of symptom reporting over time (through medical record review)

- Evaluation other physicians analysis of possible symptom embellishment

- Assessing behavioral reliability

It is beyond the scope of this presentation to review all of the psychological tests that are used with pain patients (for that purpose the reader is referred to such volumes as Gatchel, Andersson, Deardorff, et al., 2001; Gatchel, Deardorff et al., 2006; Gatchel and Weisberg, 2000; Turk and Gatchel, 2002; and Turk and Melzack, 1992). The following reviews examples of commonly used tests and these are of both the "adapted-for-use" type and the specifically-designed type:

The Minnesota Multiphasic Personality Inventory (MMPI-2)

The original MMPI was the most commonly used standardized personality test with chronic pain patients. The original MMPI was revised and released as the MMPI-2. Similar to its predecessor, it is likely that the MMPI-2 will also be the most commonly used personality test with chronic pain patients. Some of the strengths in using the MMPI-2 with chronic pain patients are follows:

The identification of psychopathology and personality disorders. There is a high prevalence of psychiatric and personality disorders among chronic pain patients. Identifying these psychopathological disorders is extremely important in the management of a chronic pain problem.

The identification of personality and behavioral characteristics. The identification of personality and behavioral characteristics of chronic pain patients differs from the identification of psychopathology. Examples of pain patient personality characteristics that might be identified by the MMPI -2 include such things as dependent personality trends, passive aggressiveness, and obsessive-compulsive behavior. Identification of these characteristics by the MMPI-2 can help in treatment planning with chronic pain patients.

The MMPI-2 yields standardized scores. Another strength of the MMPI-2 is that the scores are standardized. The experienced MMPI-2 user will compare a chronic pain patient's profile not only with the normative reference group but also with other chronic pain patient profiles and subgroups developed though statistical means.

The MMPI-2, treatment planning and prediction of outcome. Many users of the MMPI-2 use it to make predictions regarding patient behavior, including response to treatment and treatment outcome. Many studies have shown that MMPI-2 profiles of chronic pain patients can be reliably classified into three or four major subgroups. The subgroups have been found to differ reliably from one another on such variables as pain intensity, medication use, functional disability, and employment status, and surgery outcome.

The MMPI-2 is not face valid and allows for detection of response bias. The MMPI-2 is one of the only instruments that has several sophisticated mechanisms to check for response bias by the patient. In addition, the vast majority of the items are not face valid. Therefore, the clinician can generally tell if the patient answered the questions with a response bias (for whatever reason) that might affect the final profile results.

Anyone using the MMPI-2 to assess the personality characteristics of chronic pain patients must also be aware of its weaknesses and avoid inappropriate use of the instrument. Critical areas to be aware of include the following:

Length of the test and item content. The MMPI-2 contains 567 true-false questions. For the chronic pain patient to complete the test it can take several hours and may have to be completed over several sessions. Some clinicians believe that, although the MMPI-2 might yield useful information, the amount of time required to complete the test does not make it cost effective. Another common complaint of pain patients taking the MMPI-2 is its item content. Pain patients are particularly sensitive to psychological assessment since they believe the clinician may be implying the pain is "imaginary." This issue always has to be managed carefully by the referring physician and the pain psychologist doing the assessment. The method in which the MMPI-2 is introduced to the patient is critical.

Standardization sample is not appropriate for pain patients. It has been argued that the results of the MMPI-2 profiles are invalid when used with chronic pain patients due to the inclusion of items that reflect features of both a psychiatric disturbance and a chronic illness such as long term pain. Scales 1 (Hypochondriasis) and 3 (Hysteria) contain a number of items reflecting a general medical or physical condition. Research has shown that elevations on Scales 1 and 3 can be reflective of disease rather than psychological status. This must be taken into account when interpreting MMPI-2 results.

Incorrect interpretation of test results. For a clinician who is not extremely familiar with the use of the MMPI-2 with pain patients, there is a high risk of misinterpretation of the results. The risk of misinterpretation is due to several factors including the standardization sample, the contamination of certain scale items with physical symptoms, and the "outdated" scale names that purport to measure something they do not. A test interpreter who is not aware of these issues is likely to make a serious mistake in the MMPI-2 interpretation.

Battery for Health Improvement-2

The Battery for Health Improvement-2 (BHI-2) is a 217-item, self-report, multiple-choice instrument designed for the psychological assessment of medical patients. The purpose of the test is to provide relevant information and treatment recommendations to professionals who treat injured patients in a variety of settings, including physical rehabilitation, vocational rehabilitation, and general medicine. The BHI-2 has 18 scales organized into five domains: Validity scales, Physical Symptoms scales, Affective scales, Character scales, and Psychosocial scales. The BHI-2 was designed for patients 18-65 years old who are being evaluated or treated for an injury. The test was designed for patients with at least a 6th grade education and takes approximately 35 to 40 minutes to complete.

Unlike many psychological tests that have been adapted for use with medical patients, the BHI-2 was designed specifically for this clinical population. As discussed in The Manual (Disorbio and Bruns, 2003), self-report psychological tests tend to "overpathologize" what might actually be normal or expected for the

average medical or rehabilitation patient. Thus, traditional psychological tests must be used with caution and interpreted accordingly by a qualified individual. As documented in The Manual, research relative to the development of the test has been extensive. This has included establishing normative values, demonstrating reasonable reliability (internal, test-retest), and assessing validity by correlating BHI-2 scales with scales from other established instruments (e.g., MMPI-2, MCMI-III, etc.). One potential problem with the BHI-2 that the user should be aware of is that there does not seem to be much clinical research yet available outside of that done by the authors during test development.

Millon Behavioral Medicine Diagnostic (MBMD)

According to the test publisher, The Millon Behavioral Medicine Diagnostic (MBMD) is designed to assess psychosocial factors that may support or interfere with a chronically ill patient's course of medical treatment. The MBMD consists of 165 True-False items and take between 20-25 minutes to complete. The test result yield 29 Content Scales grouped into five domains (Psychiatric Indicators, Coping Styles, Stress Moderators, Treatment Prognostics, Management Guide), three Response Patterns (Disclosure, Desirability, Debasesment) and six Negative Health Habits (Alcohol, Drugs, Eating, Caffeine, Inactivity, Smoking). The MBMD provides two sets of normative data: general medical and bariatric. The MBMD is an update and expanded version of the Millon Behavioral Health Inventory (MBHI).

As with other instruments (except for the MMPI/MMPI2) research on the use of the MBMD with chronic pain patients is limited and the test was designed for general medical use. There are no scales or norms specific to pain patients. There is also a high level of item of overlap on scales. As part of a comprehensive evaluation, it can help in the understanding risk factors and personality factors in chronic pain treatment.

Symptom Checklist-90-Revised (SCL9-R)

The SCL-90R consists of only 90 items that are rated on the five-point scale (0 to 4). The instructions and questions are very straightforward and most patients can complete the test within 15 to 30 minutes. The results yield nine scale scores: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety Paranoid Ideation, and Psychoticism. There are also three global measures of psychological distress: Global Severity Index, Positive Symptom Distress Index, Positive Symptom Total. The SCL 9O-R has become one of the most commonly used measures of psychological distress among chronic pain patients.

Similar to the MMPI, one of the important uses of the SCL 90- R is the identification of psychopathology. The SCL 9O-R has been used extensively in medical settings as a screening tool and outcome measure. The SCL 90-R is a

good instrument for screening for global psychological distress in medical patients. It is brief, easy to score, and generally well-tolerated by patients.

Also similar to the MMPI, the SCL 9O-R yields standardized scores. This allows the clinician to compare the individual profile of the pain patient against the normative sample and other groups. The test has been standardized using non-psychiatric and psychiatric normative samples. Although the SCL 9O-R measures various psychological problems the item wording on the SCL 90-R seems to be less objectionable to most patients as compared to the MMPI.

The SCL 90-R has shown reasonable convergent validity with MMPI scales and subscales. Thus, an argument can be made for the use of the SCL 9O-R in place of the MMPI when one wants a measure that is brief, as well as being simple to administer and score. Alternatively, some pain centers will first use the SCL 9O-R as a screening tool and then administer the MMPI only to those patients who show elevated scores on the SCL 90- R.

The problems with the SCL 9O-R are somewhat similar to those leveled at the MMPI. First, the SCL 9O-R was originally designed to be used on psychiatric patients. Critics contend that using the SCL 9O-R with pain patients causes significant problems due to unsuitability of norms, questionable relevance of clinical signs and the misinterpretation of results. Thus, any interpretation of results much take into account the effect of the patient's report of physical symptoms in elevating certain scales.

Another criticism is that, like most of the other instruments except the MMPI2, the items on the SCL90-R are very face valid. In addition, there is no scale or means of checking for response bias or conscious manipulation of test results by the patient.

Beck Depression Inventory (BDI/BDI-2)

The original Beck Depression Inventory (BDI) is a 21 multiple-choice item test reflecting specific behavioral signs of depression that are weighted in severity from 0 to 3. The total score is obtained by adding the weighted values for each response endorsed by the patient. Scores of 0-9 are considered normal, 10-15 range is seen as mild depression, 16 to 19 represents mild to moderate severity, 20-29 is judged as moderate to severe, and 30+ represents severe depression. The instrument was originally standardized using psychiatric patient populations.

The BDI is very easy to administer and score. It takes a patient between 5 and 10 minutes to complete the questionnaire and the questions are very straightforward. The BDI has been shown to be a reliable and valid index of severity of depressive symptoms in chronic pain patients.

The BDI has been slightly revised to the BDI-2. The BDI-2 has essentially the same questions as the original BDI except it has been divided into two subscales: physical and cognitive (or mood). This allows the clinician to see which factors are responsible for an elevated score. This can help minimize false positives in a pain patient population in which a patient has an elevated score due to physical symptoms but is not depressed.

The BDI is a very face valid instrument. Thus, if a patient desires to present an inaccurate clinical picture of his or her emotional status, the BDI is easily manipulated. This generally does not occur and, if suspected, the BDI results can be correlated against other clinical data such as the initial interview, history, and other test measures.

Brief Battery for Health Improvement-2

The Brief Battery for Health Improvement-2 (BBHI-2) was developed to serve as a tool for assessing medical patients who may be experiencing problems with pain, functioning, somatization, depression, anxiety or other factors relevant to rehabilitation and recovery (Disorbio and Bruns, 2002). The test is 63-item, self-report, multiple-choice instrument designed for the psychological assessment of medical patients. The BBHI-2 is a shortened version of the BHI-2. The purpose of the test is to provide relevant information and treatment recommendations to professionals who treat injured patients in a variety of settings, including physical rehabilitation, vocational rehabilitation, and general medicine. The BBHI-2 has 6 scales that cover three content areas: validity (defensiveness), physical symptoms (somatic complaints, pain complaints, functional complaints), and affective symptoms (depression and anxiety). The BBHI-2 was designed for patients 18-65 years old who are being evaluated or treated for an injury. The test was designed for patients with at least a 6th grade education and takes approximately 7 to 10 minutes to complete. The test is especially useful for tracking patient progress and response to treatment.

The problem with the BBHI-2 is the same as the BHI-2 in that there is not much research outside of the development studies. The brevity of the BBHI-2 makes it most useful as: (1) a screening tool to identify patients in need of further assessment, (2) a test-retest measure of progress and response to treatment, and (3) a test to be used in conjunction with more comprehensive psychological testing.

A number of more specific measures have been developed for use with chronic pain patients specifically. These can be very useful depending on the targets of assessment chosen.

Multidimensional Pain Inventory (MPI)

The MPI is a 56-item measure comprised of three sections. The first section includes items assessing: (1) pain severity and suffering; (2) interference of functioning due to pain; (3) perceived life control (4) affective distress; (5) support from spouse or significant other. The second section assesses the patient's perception of how much the spouse or significant other is displaying solicitous, distracting, or punishing responses to pain or suffering behavior. The third section assesses the patient's level of activity in areas of household chores, outdoor work, activities away from home, social activity and general activity level. The length of the MPI is well tolerated by patients, taking only about 15 to 20 minutes to complete.

The computer scoring generates a scaled T-score and classifies the case into one of three empirically derived prototypic profiles: "Dysfunctional" (high pain severity, affective distress, and life interference with low life control and activity levels); "Interpersonally Distressed" (low levels of support from significant others); and, "Adaptive Coper" (the opposite of Dysfunctional: low levels of pain severity, affective distress, and life interference with higher levels of life control and activity).

The MPI was specifically developed for pain patient assessment. The standardization and normative data are all derived from populations of pain patients. The MPI is theoretically linked to a cognitive- behavioral perspective of chronic pain and health assessment. Because the MPI was developed for use with pain patients, the item is relevant to the experience of the person with chronic pain. Therefore, patients generally do not question why the questionnaire is being used to assess their problem.

The MPI was designed to be a brief measure of specific characteristics of pain patients. As such, it does not yield any detailed information about such things as depression, anxiety or somatization (the affective distress scale has questions and its content is related). It also is not designed to screen for psychopathology that might impact chronic pain treatment. Therefore, the MPI might be best used in conjunction with another instrument such as the SCL 9O-R or MMPI-2.

Coping Strategies Questionnaire (CSQ)

The CSQ is a 50-item self-report instrument originally designed to assess six cognitive (diverting attention; reinterpreting pain sensation; coping self-statements; ignoring pain sensation; praying or hoping; catastrophizing) and two behavioral (increasing activity level; increasing pain behaviors) coping strategies. This instrument also includes two items that ask patients to report their perceived control over pain and their ability to decrease pain.

The psychometric properties of the CSQ are good, and it has received a great deal of clinical research attention in terms of comparing reported use of coping strategies to indices of patient functioning and treatment outcome. For example, one major association between the CSQ factors and adjustment to chronic pain is that patients who report catastrophizing thinking styles and who view themselves as ineffective at controlling their pain appear to be more disabled and depressed at initial assessment as well as follow-up assessment. Results such as these speak highly of the clinical utility of the CSQ with pain patients.

Factor analytic studies of the CSQ have failed to reveal a reliable factor structure, thus indicating the empirical difficulty of identifying distinct dimensions of coping. This suggests the need for additional research evaluating the "active ingredients" of patients' self-reported coping responses. Although this suggests a theoretical shortcoming with regard to the structure of coping strategies, it does not distract from its clinical utility.

Chronic Pain Coping Inventory (CPCI)

The CPCI is a recently developed instrument comprised of 64 items that yields scores on 8 main subscales measuring coping strategies that are frequently the target of treatment in multidisciplinary programs: Guarding, Resting, Asking for Assistance, Relaxation, Task Persistence, Exercising, Stretching, Coping Self-Statements, and Seeking Social Support.

The CPCI was developed specifically for use with chronic pain patients and attempts to overcome shortcomings of other coping measures. Most coping measures assess primarily cognitive coping strategies (e.g., the Coping Strategies Questionnaire) to the exclusion of behavioral strategies. The CPCI was designed to assess behavioral coping strategies. Because the CPCI is so new, there is a limited amount of research available; thus, it is unknown how the CPCI results related to such issues as treatment planning and prediction of outcome.

Obviously this listing is not exhaustive. We cannot over emphasize the need for the practitioner to be aware of the reliability and validity issues specific to each measure for each usage. Failure to recognize limits of interpretation of test results is contrary not only to good clinical practice but also to ethical standards.

OBSERVATION

Observation of the chronic pain patient is one of the most fundamental methods of assessment and can provide the clinician with information applicable to many of the target areas described in the model. Observation can be unstructured or highly structured and can be made directly by the clinician, by family members, or by health care providers. Furthermore, these observations can be audiotape or videotape recorded.

Assessing Behavioral Reliability

Assessing behavioral reliability related to chronic pain is an essential element in forensic assessment (QME, AME, IME). According to the AMA Guides, assessing behavioral reliability involves the following (p.582):

Congruence with established condition. If a patient's pain behavior are consistent with a known medical condition, then credibility is supported. If the behavior is not consistent, then credibility is suspect. For instance, in a complex regional pain syndrome of the upper extremity one might expect extreme sensitivity to "light touch of a health-appearing extremity following a trivial injury" (referred to as allodynia, AMA, p. 582). Similar symptoms in the low back region due to a musculoskeletal condition would suggest symptom embellishment.

Consistency over time and situation. Pain behaviors should be reasonably consistent regardless of situation and other external factors. For example, a chronic pain patient who presents for evaluation using a walker and exhibits a shuffling gait would not be expected to be seen ambulating effortless over several hours on video surveillance.

Consistency with anatomy and physiology. Chronic pain symptoms that are not consistent with anatomy and physiology are suggestive of possible symptom embellishment. For instance, a herniated disc at L5-S1 to the right compressing a nerve root should result in a predictable radicular pain pattern in the right lower extremity. Diffuse pain throughout the entire right lower extremity or predominately in the left lower extremity might suggest a problem with consistency.

Observer agreement. As discussed in the AMA Guides (p. 582), it is important to gather collateral information from relative, friends, employers, and other professionals, as available. This information can help to confirm or dispute the patient's observed pain behaviors.

In most instances, the source of observational data will be during the clinical interview, as well as in the office setting or outpatient clinic (e.g., waiting room, walking to and from the office, etc). If the patient is being assessed on an inpatient basis, observation can be made on the unit, etc. Another important source of observational data is the interaction between the patient and significant others. It can be very helpful to have family members available to be interviewed as part of the evaluation. This can give the clinician a sense of how family members are reacting to pain behaviors of the patient. Observations can be quantified through rating methods, content analyses (e.g., somatic focus) or

frequency scores (e.g., pill counts to determine compliance) among other methods. The clinician can also collect impressions in an effort to generate hypotheses for more precise testing. It is especially useful to compare direct observation of behavior to others, perceptions of the behavior, or to the patient's own perception of his or her behavior (e.g., the "demanding patient"). Reasons for the lack of correlation could be clinically very meaningful and thus help target areas for intervention.

ARCHIVAL DATA

Archival data might include the patient's medical chart, literature reviews relating to the pain condition, employment records, etc. Literature reviews of the chronic pain condition including cause, symptoms, course, prevention, treatment, and psychological components can provide archival data that is useful in the assessment process. Having a familiarity with the pain problem before assessing the patient can be very useful in helping the clinician obtain the more relevant information as efficiently and effectively as possible. It also helps to establish the credibility of the clinician with the patient. If you are referred a pain patient who has a condition with which you are not familiar, a quick Internet search of a reputable medical website can provide useful information prior to the initial evaluation.

Reviews of previous medical and psychiatric charts are very valuable sources of information in the assessment of the chronic pain patient. The data from these archival sources can be compared and contrasted with that collected elsewhere (e.g., patient self-report, psychological testing, etc). Although these records are not always easily obtained, the clinician will find the information contained within them most useful in providing a historical perspective of the patient, his or her problem, and aspects of help-seeking behavior.

PART III - SPECIAL ISSUES

Some of the most commons areas to be aware of relative to chronic pain patient include medication management, long-term opioid treatment, physical re-activation, and pre-implant psychosocial evaluation screenings.

MEDICATIONS FOR CHRONIC PAIN

This section is an overview of medicines that are commonly used in the treatment of pain. It is important for the pain management clinician (or QME evaluator) to be familiar with the various medications that are commonly used in the treatment of chronic pain. The issue of long term opioid maintenance will be discussed in a separate section. This information is also important in forensic assessment.

Why Do I Need to Know This Stuff?

It is important to assess a patient's current medication regimen and history. This includes the following:

• possible side-effects the patient might be experiencing to the medicines
• whether or not the patient is taking the medication as prescribed
• the patient's ongoing response to the medication regimen
• any evidence of medication abuse, "doctor shopping" or use of illicit drugs

During the assessment, it can be useful to ask the following questions:

Medication Questions
• What is your current medication regimen? • Have there been any changes in your medications since your last visit? • Which physician is prescribing each medication? • How are the medications working (or not working)? • Do you notice any side effects to the medications? • What is your understanding of how the medications are prescribed? • How are you actually taking the medications?

Traditional medicine will often look to medicating chronic pain suffering without providing other treatments (e.g., physical conditioning, relaxation training, and mind-body approaches), which are more likely to have long-term benefit. In the vast majority of cases of chronic pain, if a decision is made to use medication, it should be done in conjunction with a treatment plan including other approaches. Medications used for chronic pain can be divided into seven general categories, as follows:

1. Nonsteroidal anti-inflammatories and acetaminophen
2. Muscle relaxants
3. Opioids
4. Antidepressants
5. Antianxiety agents
6. Sedatives (hypnotics)
7. Anticonvulsants

Nonsteroidal Anti-inflammatory Drugs (NSAID) and Acetaminophen.

These medications have been placed together since they are commonly used in the treatment of chronic pain. NSAID's have been around for over 100 years. They are a class of medications that, as their name implies, have the purpose of

reducing inflammation. Inflammation can also be thought of as a "swelling" and includes a process whereby local chemical irritants are released from the involved tissue. These chemicals have several effects on the surrounding tissue, including altering the normal patterns of blood flow and irritating the nerve endings that carry the pain signal (nociception). As an example, when you suffer from a bruise, you will see a black-and-blue mark or bump on the skin, including swelling. This happens because of a local inflammatory reaction in which various chemicals are released, causing leakage of fluid into the local area, irritation of nerve endings, and changes in blood flow. The chemicals released during the inflammatory process include prostaglandins, which have an ability to stimulate various cells associated with the inflammatory process. If not brought under control, this inflammatory process can persist and impede healing, as well as being painful. NSAID's are directed at stopping the inflammatory process by inhibiting the production of prostaglandins.

One of the original anti-inflammatory drugs commonly used is aspirin. Besides reducing inflammation, aspirin also has the properties of being an analgesic and antipyretic (antifever) medication. In many studies aspirin has been found to be as effective as other prescription medications for chronic pain. Although aspirin remains the first and most widely used of the NSAID's, it can be associated with several side effects including gastrointestinal upset, ulcers, and increased bleeding tendencies, among others. Using enteric-coated forms of aspirin to protect the GI tract can help with some of these side effects.

There has been a rapid proliferation in the development of various classes of anti-inflammatory agents. All of these have certain pharmacologic similarities in that they inhibit the synthesis of prostaglandins. The most commonly known NSAID's presently used in the United States, aside from aspirin, include ibuprofen (Motrin and Advil) and naproxen (Naprosyn and Aleve). People use these NSAID's for everything from sports injuries to menstrual cramps to headaches. One of the newest categories of NSAID's is the COX-2 inhibitors including Vioxx, Celebrex and Bextra. The COX-2 inhibitors are purported to provide the anti-inflammatory action without the GI problems. Vioxx was recently completely removed from the market due to a pattern of serious cardiac side effects. Other medications in the COX-2 category are now under closer scrutiny to determine safety of long-term use. It should be noted that cardiovascular risk extends to all non-aspirin NSAID's with the highest risk found in the Cox-2 agents.

Because NSAID's can cause nausea and GI upset, the medication should only be taken with meals. NSAID's can also increase bleeding time, which slows down blood clot formation and increases the possibility of bruising. Less common side effects include tinnitus (ringing in the ears), light-headedness, and gastritis. Many of the NSAID's are metabolized primarily by the kidneys and some by the liver, so these organs need to be checked regularly if there is chronic use. The main reasons not to use NSAID's include ulcer disease and bleeding problems. NSAID's should be prescribed on a regular dosing schedule for most conditions and usually

continued for at least two weeks. This allows for establishment and maintenance of a therapeutic blood level.

Acetaminophen (Tylenol) is a very commonly used analgesic both alone and compounded with other medicines. It has pain relieving properties but no anti-inflammatory effect. Similar to the NSAID's, acetaminophen should be taken for at least several days to have an effect on chronic pain. In chronic pain patients, the acetaminophen is most often taken combined with some other analgesic. This is usually codeine (e.g., Tylenol #3), hydrocodone (e.g., Vicodin, Lorcet, Norco) or oxycodone (Percocet). It is generally recommended to limit the total amount per day of acetaminophen from all sources due to possible negative effects on liver function. It is important for the QME to be aware of these issues, since he or she may be the first to uncover a problem. A common example might be the patient who is taking 5 Vicodin per day as prescribed by the physician (500 mg of acetaminophen per pill yielding 2500 total) and then decides to add an over the counter Extra Strength Tylenol with each dose to try and get better relief (5 per day at 500 mgs each yields 2500 total). The total dose is 5000 mg per day, which is well over the recommended amount. Add to this a patient who has an alcohol drink or two each evening and problems can develop. Often, the patient will not mention adding the OTC medications to their doctor and, as discussed previously, blood tests may not be regularly scheduled.

Muscle Relaxants

Muscle relaxants (or skeletal muscle relaxants) are divided into two categories: antispastics (for conditions such as cerebral palsy and multiple sclerosis) and antispasmodics (for musculoskeletal conditions). This discussion will focus on the antispasmodics for the treatment of musculoskeletal conditions since this is a common complaint in chronic pain (See and Ginzburg, 2008a, 2008b). Muscle relaxants are usually prescribed with the goal of reducing muscle spasm and generally should be used on a limited and short-term basis. In the case of chronic pain, this might include short term use for pain exacerbations. How muscle relaxants work remains somewhat controversial. Many of these medications are known to work through the central nervous system and thereby secondarily relax the muscles by "relaxing" the brain. There are several muscle relaxants that appear to work directly on the cells of the muscle itself by decreasing the "hypercontractual state" (overcontracted or in spasm). However, these also have known effects on the central nervous system. Among the more commonly prescribed muscle relaxants in use today for musculoskeletal disorders include:

- Soma (carisoprodol)
- Flexeril (cyclobenzaprine)
- Skelaxin (metaxalone)
- Robaxin (methocarbamol)
- Valium (diazepam)
- Zanaflex (tizanidine)

All of the muscle relaxants are known to have effects on the brain, including a slowing of overall mental functioning and sedation. In addition they may have an anxiolytic effect (in fact Soma is metabolized to meprobamate, an anxiolytic). Efficacy of the muscle relaxants appears to diminish over time and there is the risk of dependence. Although it is recommended that their use be short term, one will often see chronic pain patients taking these medications at fairly high doses over the long term. In many cases, a careful assessment indicates the patient is using the medication more for its sedative (and possibly anti-anxiety effects) than muscle relaxation.   One of the muscle relaxants purported to be non-sedating is Skelaxin; however, drowsiness is listed as a side-effect.

Long term use of muscle relaxants can cause significant problems. For instance, patients can become dependent on muscle relaxants especially when using them as a sleep medication. In addition long-term use of these medications may potentially promote symptoms of depression. Many muscle relaxants (most notably Valium) also play a role in reducing anxiety and, although this might be helpful for a short period of time in patients with acute pain or a chronic pain flare-up, they are addictive. Muscle relaxants should generally not be prescribed if it becomes clear that they are being used for anxiety and agitation rather than spasm. Unlike NSAID's, some physicians feel it can be appropriate to utilize muscle relaxants on an as-needed basis in the treatment of chronic pain. If the spasm is severe and not responding to ice, heat, or stretching, then muscle relaxants can be used as an adjunct for short-term relief. They should never be used as a substitute for these other methods of reducing spasm. The most common side effects of muscle relaxants relate to their depressant effects on the central nervous system. Dependency on the medication is the other major concern in view of their role in reducing anxiety, helping with sleep, and causing somewhat of a euphoric state in some individuals. Dosages of these medications vary significantly.

In summary, the role of muscle relaxants should be quite limited to cases where muscle spasm is a well-defined component that is not responding to physical interventions, such as ice, heat, and stretching. For chronic spasms, biofeedback and relaxation training would be more appropriate. Long-term use of muscle relaxants is generally not indicated for chronic pain. Some specialists will use muscle relaxants rarely for two reasons. First, there is controversy as to whether muscle spasm is even significant in many musculoskeletal chronic pain problems (e.g., back pain). Second, the muscle tension, if it is present, may actually serve a protective function. These reasons, as well as those listed above, underscore that muscle relaxants should only be used in clear cases of muscle spasm when other modalities have not been effective and only on a time-limited basis.

Opioids

This section will be an overview of the use of opioids in chronic pain treatment. A subsequent section, Chronic Opioid Therapy for Chronic Noncancer Pain, will specifically address long-term opioid maintenance. Opioids and related compounds (e.g., semisynthetics such as oxycodone and synthetics such as methadone) are perhaps the most commonly used medications for all types of pain. The evidence for their efficacy in acute pain (including cancer pain) problems is without question. The use of opioids for chronic noncancer pain is widespread but controversial.

There are five important concepts in the long-term use of opioids with chronic pain patients: *tolerance*, *pseudotolerance*, *physical dependence*, *addiction, and pseudoaddiction*. Patients very often confuse these terms and concepts causing problems with medication compliance. Also, patients often have a fear of addiction, which causes non-compliance to the medication regimen and, in turn, poorer pain control. Careful explanation of the following concepts can be helpful for patients who are skeptical of appropriate pain medication regimens.

Understanding Key Concepts in Pain Medication Management

The clinician should understand that a large body of research has demonstrated that if pain medication is given for a legitimate reason (e.g., related to surgery), *addiction* to analgesics is very unlikely (Cleary & Backonja, 1996; Porter, 1980; Portney, 1994; Zenz, Strumpf & Tryba, 1992; See also Chou et al., 2009, for a review). When evaluating medication use, it is important to understand the difference between important pain medication concepts: tolerance, pseudotolerance, physical dependence, addiction, and pseudoaddiction (See American Academy of Pain Medicine, the American Pain Society & American Society of Addiction Medicine, 2001):

Pain Medication Concepts

Tolerance is a well-known property of all narcotics. It is the need for an increased dosage of a drug to produce the same level of analgesia that previously existed. Tolerance also occurs when a reduced effect is observed with a constant dose. Tolerance occurs at a chemical level in the body primarily through the liver producing more enzymes to neutralize the effects of the medicine. Some physicians believe that a certain level of opioid use can be reached for pain control and stabilized over the long term without the need for increasing the dose due to tolerance, but this is controversial.

Pseudotolerance is the need to increase dosage that is not due to tolerance but due to other factors such as changes in the disease, inadequate pain relief, change

in medication, increased physical activity, drug interactions, lack of compliance, etc. Patient behavior indicative of pseudotolerance may include drug seeking, "clock watching" for dosing, and even illicit drug use in an effort to obtain relief. Pseudotolerance can be distinguished from addiction in that the behaviors resolve once the pain is effectively treated.

Physical Dependence is also a well-known and understood physical process. It is a state of adaptation that is manifested by a specific withdrawal syndrome that can be produced by abrupt cessation, rapid dose reduction, decreasing blood level of the drug, and/or administration of an antagonist. The withdrawal syndrome might include such things as tremors, cramps, agitation, sleep disruption, and diarrhea. The patient might also notice an increase in the pain over the short term. Physical dependence is not a problem if patients are warned to avoid abrupt discontinuation of the drug, a tapering regimen is used, and opioid antagonist (including agonist-antagonist) drugs are avoided.

Addiction is a *psychological dependence* on the medication for its psychic effects and is characterized by compulsive use. The medication is sought after and used even when it is not needed for pain relief. Addiction includes aspects of tolerance and dependency due to chemical events associated with long-term use. It should be noted that although addiction includes tolerance and dependence, the reverse is not necessarily true. One can show tolerance and dependence without showing addiction. In fact addiction is a well-known, although relatively rare, occurrence in patients using narcotics for pain relief.

Pseudoaddiction is drug-seeking behavior that seems similar to addiction, but is due to unrelieved pain. The behavior stops once the pain is relieved, often through an increase in pain medication. If the patient complains of unrelieved pain and shows drug-seeking behavior, careful assessment is required to distinguish between addiction and pseudoaddiction.

Healthcare professionals (and patients) often confuse these concepts. Both tolerance and dependence commonly occur in pain medication use and can be readily managed by the physician specializing in this area. Tolerance can be managed by adding other non-addictive medicines that help the narcotics work better and/or emphasizing non-medication pain control techniques. Dependence is addressed by slowly tapering the pain medication and, possibly, adding other medication to control withdrawal symptoms, as appropriate. The pain management clinician is often called upon to help the physician differentiate among symptoms of possible addiction, pseudoaddiction, and pseudotolerance.

Dr. Richard Sternbach has identified how tolerance and dependence on pain medicine can actually lead to higher levels of pain perception. Patients who have attained higher levels of pain medicine use will occasionally attempt to decrease their use. When they do attempt this decrease, withdrawal symptoms occur, the

most prominent of which is usually an increase in pain. The patient will state that he or she does not have a "craving" for the medication except to relieve the pain. This increase in pain, in addition to the lack of craving, is then used as a rationale for the patient (and the patient's doctor) to once again increase the analgesic use, stopping the withdrawal symptoms, and decreasing the pain. This pattern will only lead to higher levels of pain, dependence, and tolerance.

Dr. Sternbach has identified this phenomenon as a "conditioned pain response." In this process, at the early stages of pain medication use the patient waits until the pain is very severe before taking the medicine. The pain medicine results in a decrease in pain, which is a positive reinforcer. Anything that results in positive reinforcement is likely to be done again or to occur again. Therefore the next time the patient has pain, he or she is more likely to take a pain pill. This process continues until tolerance and dependence develop. When this occurs, the withdrawal symptom of increased pain is more likely to occur as the medication wears off. As Dr. Sternbach says, "The pain becomes more severe as a signal to replenish the supply of narcotics which the body has now come to need." This, then, becomes a conditioned pain response in which higher pain levels are reinforced by the pain medicine. It should be noted that this process is not related to imaginary pain or addictive behavior.

Aside from the possibility of a conditioned pain response, the opioids are not without significant side effects. Long term opioid use includes risk factors of constipation, itchiness, hypogonadism (shrunken testicles), interaction with other medication, respiratory depression, and accidental overdose. In addition, recent studies have identified the potential for another side-effect to long term opioid use: opioid-induced hyperalgesia (increased pain perception; Mercadante, Ferrera, et al., 2003). In this condition, the pain perception is made worse by the long term opioids.

A significant controversy exists among medical professionals in determining the appropriate long-term use for narcotic analgesics in chronic noncancer pain. There is widespread acceptance that it is reasonable to use narcotic analgesics for pain relief in the short term when the patient has severe pain and is unable to obtain relief by any other means. However, there is controversy when it comes to using these medications for chronic noncancer pain, and most physicians prefer other pain-control approaches.

Any analgesic taken long-term should be used on a "time-contingent" basis rather than ''as-needed.'' On a time-contingent schedule the medication is taken on a fixed schedule rather than according to symptoms, regardless of the pain level. For instance the schedule might be one tablet every four hours. The idea behind this approach is to keep the pain relieving effect constant, avoid the ups and downs of the as-needed approach, and prevent the conditioned pain response from occurring. It can also prevent severe pain episodes by catching the pain early.

Some of the newer time-release opioids have taken care of this time-contingent dosing problem since the dosing is either once or twice per day (e.g., Oxycontin, Kadian). It is always important for the patient to utilize the lowest level of pain medicine necessary. This will help avoid tolerance and keep dependence from occurring, in addition to ameliorating the side effects of the medicine. One should always encourage the use of other non-medication approaches to pain control and increasing function (e.g., psychological and behavioral pain management interventions).

Antidepressants

Antidepressants are playing an increasing role as a medication adjunct in the treatment of chronic pain problems. All classes of antidepressant medications have been studied including the tricyclics, selective serotonin reuptake inhibitors (SSRI) and the selective serotonin and norepinephrine reuptake inhibitors (SNRI). Extensive research is showing that certain antidepressant medications can provide pain relief in many chronic pain conditions independent of their antidepressant effect. It should be underscored that the analgesic effect is seen even in patients who are not depressed. Therefore the pain relief appears to occur independent of the antidepressant effect. Extensive research is presently being done to better understand the exact roles of antidepressants for pain management. Some of the most widely used antidepressants for pain control in the area of chronic pain are the tricyclic antidepressants (TCA's) such as the following:

- Imipramine (Tofranil)
- Amitriptyline (Elavil)
- Doxepin (Sinequan)
- Nortriptyline (Pamelor)
- Desipramine (Norpramine)
- Clomipramine (Anafranil)

There is some indication that the Selective Serotonin Reuptake Inhibitors (SSRI) may have some use in certain chronic pain conditions (e.g., painful polyneuropathy, nerve injury pain) but their analgesic effect has not been firmly established. There is also ongoing research into the SNRI medication (e.g. Cymbalta, Effexor, Pristiq). There is some support for the analgesic benefit and these medications in neuropathic pain syndromes. Of course, the SSRI's and SNRI's may be appropriate to treat depressive symptoms in a patient with chronic pain. Although the exact mechanism remains somewhat unclear as to how these medicines afford pain relief, they are considered to be helpful to varying degrees in different patients. The choice of antidepressant medication will depend on the symptoms the patient is experiencing. Some of the antidepressants have sedative properties, while others have an energizing effect. In addition different antidepressants will affect different brain neurotransmitters (serotonin,

norepinephrine, dopamine). Some of the factors to be considered in choosing an antidepressant are as follows.

First, one might consider the role that antidepressants have in improving restful sleep in addition to decreasing pain. Many chronic pain patients, especially those with neuropathic (nerve) pain, have great difficulty obtaining restful sleep. The sedative properties of some of the antidepressants can be very helpful in normalizing sleep patterns while at the same time playing a role in the reduction of pain. The antidepressants seem to provide better restful sleep and other positive benefits (e.g., pain relief) than sleeping medications. In addition, unlike most sleeping medications, the antidepressants have no addictive properties and can be used over the long term. Dose ranges for antidepressants for pain versus depression can be seen in the Table.

Medication	Dose for Pain	Dose for Depression
Norpramine	75 mg	75-200 mg
Pamelor	50-100 mg	75-150 mg
Sinequan	50-100 mg	150-300 mg
Tofranil	50-75 mg	150-300 mg
Elavil	25-150 mg	150-300 mg
Desyrel	Unknown	150-400 mg

These medicines are also sometimes intended to have some role in combating depression, which is commonly seen in varying degrees associated with chronic pain suffering (as discussed previously). However, it should be reiterated that even if the patient is not clinically depressed, there appears to be a property in many of the antidepressants that decreases pain. This pain relief property occurs at dosage ranges much less than those used in the treatment of depression. For instance, a typical dose of Elavil for chronic pain would be approximately 50 to 75 milligrams, whereas the antidepressant dose might typically be 100 to 150 milligrams or more. There are also many patients who see a significant reduction of their pain and improvement in sleep with even lower doses of antidepressants. Side effects will vary depending upon the medication used. Common side effects include dry mouth, blurred vision, constipation, urinary retention, sedation, and nausea, among others. Side effects will usually be experienced when starting antidepressant medication and dissipate after two to three weeks or sooner.

Antianxiety Agents

Antianxiety agents (also termed anxiolytics or minor tranquilizers) are occasionally used on a short-term basis in chronic pain for their role in decreasing anxiety and helping with sleep. The most widely used anxiolytics are known as benzodiazepines, which include such medications as Valium (diazepam), Klonipin (clonazepam), Ativan (lorazepam) and Xanax (alprazolam). As discussed previously, Valium is also used as a muscle relaxant and most likely exerts the

majority of its effect on the central nervous system. Long-term use of the anxiolytics in chronic pain patients is generally not recommended. Most physicians generally discourage the use of these agents for anything but very short periods and in very specific cases. If the chronic pain is associated with a high degree of anxiety and agitation, these medications can be useful. As with the other medications, they should be used as part of a comprehensive approach to the chronic pain problem including teaching the patient other non-medication techniques for managing the anxiety, sleep disruption, etc.

There are certain patients with more severe anxiety disorders who also suffer from a chronic pain problem. These patients may require more long-term use of anxiolytics when they do not respond to other interventions. The patient should be followed closely and regularly by a physician familiar with the use of these medicines in the chronic pain population (e.g., a psychopharmacologist or pain management physician). The pain management clinician can help in the management of these medications by assessing the patient use and response at the regular follow-up visits as discussed previously. Any problems can be reported to the physician managing the medications.

Common side effects of the benzodiazepines include drowsiness, sedation, and short-term memory loss, among others. Many of these side effects are eliminated by adjusting the medication dose. Tolerance and dependence do develop when using these medications, just as in the case of pain medicines. Care should be taken to avoid alcohol while taking these medications. The patient should never abruptly stop taking benzodiazepines and they must be tapered appropriately as managed by the patient's physician. As with the other medications, it is not uncommon for the treating pain management clinician to be the first practitioner to find out that the patient is not following the medication prescription properly (e.g., abruptly stopping the medication, increasing the dose, consuming alcohol or other medication that might have a synergistic effect, etc).

Sedatives and Hypnotics

Sedatives (also termed hypnotics) are used for sleep. There are a variety of medications classed in this group, but they generally include: benzodiazepines (Dalmane, Restoril, Ambian, Sonata), non-benzodiazepine benzodiazepine receptor agonists, barbiturates (Amytal, Nembutal, Seconal), chloral derivatives (chloral hydrate), and antihistamines (Benadryl). The barbiturates and chloral derivatives are rarely used now due to dangerous side effects and will not be discussed. In addition to these categories, a new medication has been released (Rozerem) with a unique mechanism of action (melatonin receptor agonist).

Benzodiazepines. The most commonly prescribed medications for sleeping problems include two the benzodiazepines and the non-benzodiazepine benzodiazepine receptor agonists. Although all of the benzodiazepines are used for

the treatment of insomnia, the first five in the list are used most commonly for sleep disorders.

Dalmane (Flurazepam)
Doral (Quazepam)
Halcion (Triazolam)
ProSom (Estazolam)
Restoril (Temazepam)
Klonopin (Clonazepam)
Ativan (Lorazepam)
Xanax (Alprazolam)

The benzodiazepines have been the most commonly used medications in the treatment of insomnia and are certainly safer than some of the older sleeping medications such as the barbiturates (Amytal, Nembutoal, Seconal). However, there have been concerns regarding inappropriate use and abuse of these medications. These medications are generally recommended only to be used on a short term basis since physical tolerance and dependence can develop. In addition, these medications can often produce a "hangover" effect the following day.

Non-benzodiazepine benzodiazepine receptor agonists.   In recent years, a newer class of medications has been developed often termed the "non-benzodiazepine, benzodiazepine receptor agonists". These newer medications appear to have better safety profiles and less adverse effects. These medications are associated with a lower risk of abuse and dependence than the benzodiazepines. Examples of medications in this class include:

Ambien (Zolpidem)
Sonata (Zaleplon)
Lunesta (Eszopiclone, formerly known as Estorra)

These medications are known to reduce the time it takes to fall asleep and, thus, their effects are quite similar to those in the benzodiazepine class. These medicines appear to have different characteristics and may be used in different ways. Again, although these medications are safer than the benzodiazepines, it is not recommended that they be used on a long term basis (except Lunesta which will be discussed subsequently).

Ambien. This sleeping pill has effects that persist later into the night and may help the individual stay asleep longer. Thus, it must be taken at bedtime and may be used when the individual has trouble falling asleep and/or staying asleep. Ambien CR is now available which is a longer lasting, time-released version of the medication.

Sonata. This sleep aid is generally used for those individuals having trouble falling asleep. Therefore, it is often taken at bedtime or later such as when awakening during the night as long as there are at least four or more hours left to sleep.

Lunesta. This sleep aid was approved by the FDA in December of 2004 as a new, longer lasting sleeping pill. Clinical trials have demonstrated that Lunesta helps people get to sleep faster, similar to Ambien and Sonata. However, it appears that it also helps the individual stay asleep through the night. The FDA has approved Lunesta for patients who have difficulty falling asleep as well as those who are unable to sleep through the night. Lunesta has about a six hour half life, so it is more likely to maintain sleep. Due to its long half life, Lunesta must be taken immediately before bedtime and the individual should make sure that he or she has a full eight hours devoted to sleeping before taking it. As with the other medications, side effects can occur, including daytime drowsiness, dry mouth, and dizziness. Unlike the other medications in this class which are recommended only for use on a temporary basis, Lunesta is approved for longer term use.

Melatonin receptor agonist. Rozerem (ramelteon) is the first prescription insomnia medication with a novel mechanism of action to be released in 35 years. It has been approved by the FDA and in use for many years. Rozerem has a unique mechanism of action that selectively targets specific receptors in the brain that are responsible for controlling the body's sleep-wake cycle. It works by mimicking melatonin, a naturally occurring hormone that is produced during the sleep period. Rozerem may have an advantage over the other benzodiazepine and non-benzodiazepine classes for the following reasons:

Melatonin Receptor Agonist Information

Benefits. Some of the reported benefits of Rozerem are:

It specifically targets brain structures responsible for the sleep-wake cycle

It is the first and only prescription sleep medication that has shown no evidence of abuse, dependence or withdrawal (as such it has not been designated as a controlled substance by the U.S. DEA).

Rozerem is approved by the FDA to be prescribed for long-term use in adults.

Rozerem has been shown to be safe in older adults, as well as those with mild-to-moderate chronic obstructive pulmonary disease (COPD) and mild-to-moderate sleep apnea.

Problems. Some of the primary warnings, side-effects, and contraindications for the use of Rozerem include the following (there are many others but these are the most significant):

It is not recommend for use in patients with severe COPD or sleep apnea.

It should not be used in patients with severe hepatic impairment or sensitivity to the medication.

It is not recommended to be used in conjunction with alcohol consumption.

More common side-effects (greater than 2% in the study groups compared to placebo) include daytime sleepiness, dizziness and fatigue.

In primarily depressed patients, the medication may cause a worsening of depression or suicidal ideation (this issue has not been directly studied with Rozerem but is seen with other sleeping medications).

Rozerem and chronic pain. Some of the issues that should be taken into account when using Rozerem for insomnia associated with chronic pain include the following:

As with the other sleeping medications (aside from the antidepressants), the use of Rozerem has not been directly studied in a chronic pain patient population.

Rozerem has no analgesic (pain relieving) properties as has been shown with some of the antidepressants medications when used for sleep.

Most chronic pain patients have difficulty initiating and maintaining sleep. While Rozerem has been shown to improve sleep-onset its effects on sleep-maintenance are unknown.

As with the other sleeping medications, Rozerem will not address any underlying medical problems causing the insomnia. It should be used in conjunction with other treatments that are focusing on the primary medical problem (e.g. chronic pain).

In using these medications one must first look at the reasons for sleep problems. If they are related to depression, then an antidepressant should be used. If they are related to anxiety, then an anxiolytic agent should be used. If they are related to pain, then an analgesic or low-dose sedating antidepressant might be most appropriate. If none of these is the case, then consideration of a sedative for short-term use may be appropriate. In choosing a sedative, the least addictive should be tried first. Using Benadryl (50 to 150 milligrams at bedtime) is a very

good first choice. If that is ineffective, the non-benzodiazepine, benzodiazepine receptor agonists can provide a good sedative effect. These are relatively safe medicines and are the least disruptive to certain types of sleep patterns. The use of barbiturates has fallen into disfavor due to the potential for abuse and the availability of the much safer non-benzodiazepine, benzodiazepine receptor agonists and the benzodiazepines. Using alcohol as a sedative is not indicated since it causes disrupted, non-restful sleep as well as early morning awakening and depression. Any sedative should be used only as needed and on a limited basis if possible. Teaching the patient other techniques for relaxation as well as good sleep hygiene is always indicated. This includes such things as going to bed and awakening on a consistent schedule, practicing relaxation exercises to fall asleep and not doing anything stressful in bed (e.g., paying bills). The pain management or behavioral health clinician can be very helpful relative to these non-medicine approaches.

Anticonvulsants

One of the newest classes of medications being used for certain chronic pain conditions are drugs originally developed for seizure disorders (called antiepileptics, anticonvulants or neurologics). The various categories of these medications will not be discussed here but four of the commonly used medicines are Lyrica (pregabalin), Neurontin (gabapentin), Depakote (divalproex sodium) and Tegretol (carbamazepine).

The anticonvulsants are generally used for specific types of chronic pain syndromes including the following:

- Painful polyneuropathy
- Postherpectic neuralgia
- Central poststroke pain
- Trigeminal Neuralgia
- Other neuropathic conditions

These medications are often used in chronic pain that is of a neuropathic nature and this is often associated with pain sensations described as burning, radiating, lancinating, stabbing, etc. Many patients have trouble with the side effects of these medications including sedation, dizziness, headache, nausea, vomiting, and cognitive changes.

CHRONIC OPIOID THERAPY FOR CHRONIC NON-CANCER PAIN

There are some physicians and researchers who feel that long-term use of opiates in very select patients with chronic pain can be an appropriate treatment and this does have some support in the clinical research. In this subset of patients who are deemed appropriate for this treatment, the goal is to achieve sustained analgesia and increased function without the occurrence of significant side effects or

aberrant behavior (addiction, abuse, etc). However, this approach continues to be highly controversial due to fears of addiction, side effects, physical dependence, and tolerance (See Clinical Guidelines for the Use of Chronic Opioid Therapy in Chronic Noncancer Pain published jointly by the American Pain Society and American Academy of Pain Medicine, Chou et al., 2009).

Dr. Russell Portenoy is probably best known for his research and interest in this area (although recently he has done somewhat of a turn-around and publically discussed his reservations about the effectiveness of this approach). He, and others, feel that there is a subpopulation of chronic noncancer pain patients who are able to obtain at least partial pain relief from chronic opioid therapy without the development of toxicity or significant tolerance. He states that substance abuse behaviors may occur, but that these are uncommon if patients are carefully selected. Patients with a history of substance abuse tend to be at risk for developing problems in this regard. The most common physical side effects of long-term pain medicine use include persistent constipation, insomnia, and decreased sexual function. In addition there may be cognitive difficulties (trouble thinking clearly or focusing) and sedation initially, but it appears that these effects tend to diminish over time, although some patients do report continued "mental clouding" sufficient to impair functioning. In pursuing such a treatment approach with chronic non-cancer pain patients, Dr. Portenoy has proposed very specific guidelines for patient selection and evaluation of the treatment. As can be seen from the screening criteria, the assistance of an appropriately trained pain management clinician is indicated for both evaluation and ongoing treatment. The QME may come across and number of patient on COT that have not been properly screened or managed appropriately. Certainly, this should be addressed in the report. The screening and management criteria are as follows:

Screening Criteria for Chronic Opioid Therapy

Chronic opioid therapy should be considered only after all other reasonable attempts at pain control have failed.

Any history of substance abuse should preclude this type of approach.

A pre-trial psychological screening evaluation should be completed.

A single physician should take primary responsibility for this treatment.

Patients must receive adequate informed consent prior to starting the treatment.

Doses should be given on a time-contingent, around-the-clock, basis.

The patient should obtain at least partial pain relief at relatively low initial doses. If

this is not seen, then this type of treatment is probably not appropriate.

This type of approach should be done in conjunction with other treatment interventions.

Most patients should be seen weekly at first and then on a monthly basis once the regimen is successfully established.

Evidence of drug hoarding, getting drugs from other doctors, uncontrolled escalation in doses, or other problem behaviors should result in discontinuation of the program.

Opioid therapy is not a substitute for a comprehensive multidisciplinary approach that focuses on psychological and rehabilitation approaches with a goal of restoration of function.

As can be seen from the screening criteria, it appears that very few noncancer chronic pain patients might be appropriate for this type of approach. Patient selection is critical, as is working with a physician who is knowledgeable of this type of treatment. Certainly, prior to utilizing this kind of approach, a behavioral/psychological approach to pain management including physical and mental reconditioning programs should be attempted. Even if these are not entirely successful, they should be continued in conjunction with the long-term pain medication program.

These tenets of chronic opioid therapy (COT) for chronic noncancer pain (CNCP) have been included in the new Clinical Guidelines for the Use of Chronic Opioid Therapy in Chronic Noncancer Pain published jointly by the American Pain Society and American Academy of Pain Medicine (Chou et al., 2009) under various recommendations:

1.1 Before initiating COT, clinicians should conduct a history, physical examination and appropriate testing, including an assessment of risk of substance abuse, misuse, or addiction.

2.2 Clinicians may consider using a written COT management plan to document patient and clinician responsibilities and expectations and assist in patient education.

5.1 Clinicians should reassess patients on COT periodically and as warranted by changing circumstances. Monitoring should include documentation of pain intensity and level of functioning, assessments of presence of adverse events, and adherence to prescribed therapies.

9.1 As CNCP is often a complex biopsychosocial condition, clinicians who prescribe COT should routinely integrate psychotherapeutic interventions, functional restoration, interdisciplinary therapy, and other adjunctive nonopioid therapies.

In actual clinical practice (doing QME evaluations and otherwise), I have seen many patients who are receiving long-term pain medication therapy that are either completely inappropriate for this approach or who are receiving it in an incorrect fashion. All aspects of such an approach as listed previously, and included in the new guidelines, must be adhered to in an ongoing manner. Patients will often have unrealistic expectations about using opiates long-term, believing that "if my pain were gone, then I would resume my life." The chronic opioid therapy approach tends to reinforce this type of thinking, often to the exclusion of increasing functioning and improving other aspects of a person's life. In these types of cases, a multidisciplinary pain rehabilitation program that focuses on these issues rather than moving toward a chronic opioid approach might be much more beneficial. As can be seen from the literature review and new guidelines, a psychologist should be intimately involved in the COT process both in screening and ongoing monitoring.

ASSESSING OPIOID ADDICTION POTENTIAL
IN THE CHRONIC PAIN PATIENT

A QME evaluation may need to address the appropriateness of COT treatment. This might include determining if a patient who is on opioids is showing signs of addiction, pseudoaddiction, or pseudotolerance. Assessing opioid-induced disorders in a chronic pain population is extremely difficult especially when there is no abuse of illicit or recreational drugs. As discussed by Harden (2002), "to confuse the recreational/street abuse of drugs of any type with the private clinical decision between a doctor and patient to use these drugs for an appropriate medical indication is a serious error" (p. 8). However, psychological opioid dependency does occur in chronic pain patients within the context of being prescribed by one's physician. As discussed in the review by Harden (2002), "psychological dependency, defined as an emotional state of craving for a drug for its euphorigenic effects or to avoid negative effects associated with withdrawal, occurs at variable rates dependent on specific characteristics of the clinical situation," (p. 8). Psychological dependency may be in some cases a consequence of fear of uncontrolled pain rather than pursuit of euphoria or avoidance of abstinence. Harden (2002) goes on to review the research literature that suggests the presence of certain other psychiatric diagnoses (particularly personality disorders) and certain sociologic milieu may make abuse and addiction much more likely.

Chronic pain patients often have significant disease conviction, somatic preoccupation, and an externalized locus of control. These factors often lead to increased opioid-seeking behaviors in the absence of increased nociceptive input. The non-analgesic operant reinforcing effects of taking opioids may also

exacerbate opioid-seeking behavior. Thus, one might look for a cluster of psychosocial and psychological factors to determine possible addiction (e.g., a personality disorder, fear of withdrawal, external locus of control, extreme somatic focus, and significant illness conviction).

Behaviorally, one might see a patient who has tended to run out of medications early, take more medication than have been prescribed by the physician, been non-compliant in attending any treatments that require proactive rehabilitation behavior (e.g., psychological pain management, biofeedback, etc.), and pursued invasive procedures that have initially been beneficial but ultimately fail such that more narcotic medication is requested. These types of behaviors, together with the psychosocial factors identified, support the diagnosis of a psychological opioid dependence (or addiction).

The closest DSM-IV diagnosis representing psychological opioid dependence as discussed in the pain research is opioid dependence (304.00). DSM-IV states that opioid dependence includes signs and symptoms that reflect use of opioid substances that either serves no legitimate medical purpose or, if a general medical condition is present that requires opioid treatment, are used in doses that are greatly in excess of the amount needed for pain relief (p. 248).

AGGRESSIVE CONSERVATIVE TREATMENT

Gatchel's (2004) model of physical and mental *de-conditioning* explains a patient's transition from acute to chronic pain. Consistent with this model, treatment approaches involve physical and mental *re-conditioning*. When a chronic pain patient is involved in a multidisciplinary program, addressing both mental and physical elements are required for maximum success. When the patient is involved in physical reactivation treatment, various cognitive factors must be successfully addressed. For instance, one key element will be helping the patient manage his or her fear of the pain, accepting the fact that hurt does not equal harm, and openly addressing issues that may be pressuring the patient into maintaining the sick role (and possibly sabotaging the physical therapy). This type of treatment will fall within the purview of the pain management clinician. The QME may evaluate a chronic pain patient and recommended multidisciplinary functional restoration or pain rehabilitation treatment before making that individual permanent and stationary.

Aggressive conservative treatment should generally be preceded by a careful physical evaluation by the physician. This is done primarily to rule out any underlying serious condition that may need to be addressed and to develop the physical reconditioning program. An aggressive conservative treatment program will generally be designed by the supervising physician and implemented by a qualified physical therapist or exercise physiologist; although in many cases patients can simply be given a program of exercises and complete them on their own, independent of a formal treatment setting. There are several important

aspects that must be attended to during the course of such a program. The following issues should be addressed at the beginning of such treatment (with documentation):

Preparing the Patient for Aggressive Conservative Treatment

The rationale for the treatment plan should be clearly and extensively discussed with the patient.

It is important to instill a sense of hope in the patient, even towards small gains.

The patient must accept the fact that he or she may experience a mild to moderate increase in pain upon initiation of such a program. This pain does not indicate tissue damage and is what one would expect as part of increasing activity (like going back to the gym after a long hiatus).

It is important to the treatment that the patient complies with the exercise program. This is probably the area of most concern, as people generally have trouble following through on exercise recommendations.

During the course of aggressive physical reconditioning, the patient should pay attention to cognitive, emotional, behavioral or other factors that may act as blockades to recovery. If these problems are occurring and not addressed, the physical reconditioning will not work. Possible blockades to treatment should be discussed at every pain psychology visit.

To help the chronic pain patient understand the rationale behind the importance of physical re-conditioning, it is useful to present the physical-deconditioning syndrome or "disuse syndrome".

The Deconditioning Syndrome

As far as I can determine, the deconditioning or disuse syndrome was first characterized in 1984. Since that time it has received much attention in relation to back pain problems, other chronic pain disorders, as well as other illnesses. It has been generalized beyond chronic pain problems, and some feel it is related to "the base of much human ill-being." The disuse syndrome is caused by physical inactivity and is fostered by our sedentary society. This disuse of our bodies leads to a deterioration of many body functions. This is basically an extension of the old adage "Use it or lose it." There are several physical consequences from disuse and deconditioning. These occur in many body systems, most notably those of the muscles and skeleton, cardiovascular, blood components, the gastrointestinal

system, the endocrine systems, and the nervous system. For instance, consider the following:

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Consequences of the Disuse Syndrome

In the musculoskeletal system, disuse of muscles can rapidly lead to atrophy and muscle wasting. If you have ever had an arm or a leg in a cast, you will be familiar with the fact that the diameter of the affected limb may be noticeably smaller after being immobilized for some time.

Cardiovascular effects also occur due to disuse including a decrease in oxygen uptake, a rise in systolic blood pressure, and an overall blood plasma volume decrease of 10 to 15 percent with extended bed rest.

Physical inactivity also leads to nervous system changes, including slower mental processing, problems with memory and concentration, depression, and anxiety.

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Many other detrimental physiological changes also occur that are beyond the scope of this discussion. Disuse has been summarized as follows: "Inactivity plays a pervasive role in our lack of wellness. Disuse is physically, mentally, and spiritually debilitating." Many experts believe that the deconditioning/disuse syndrome is a key variable in the perpetuation of many chronic pain problems.

In summary the disuse or deconditioning syndrome can result in a myriad of significant medical problems and increase the likelihood of a chronic pain syndrome developing. Unfortunately, common attitudes and treatments in the medical community reinforce the fear patients have about their pain (and increasing movement) leading to passive treatment and deconditioning. The deconditioning syndrome can also lead to a variety of emotional changes that are associated with an increased perception of pain. The most ideal approach to managing the physical- and mental-deconditioning syndromes is to prevent their occurrence altogether. But even if the disuse syndrome has developed, the reconditioning approach is very effective if done appropriately. Completing physical reconditioning should be guided by appropriate behavioral principles.

Physical Reconditioning

Fully participating in a reconditioning program, which includes strengthening, stretching, and aerobic exercise, is essential for maximum benefit. These programs may cause an initial increase in the patient's pain, and that is to be expected. Also, passive modality-oriented therapies such as hot packs, massage, and ultrasound are generally not indicated as part of the program since this tends to place the patient back in the sick-role. Use of ice or self-administered hot packs to help relieve symptomatic pain in conjunction with aggressive exercise may be appropriate. In chronic pain problems, it is most appropriate to exercise and physically recondition oneself using what has been termed the "quota system". The quota system was first developed by a pain psychologist, Wilbert Fordyce, PhD at the University of Washington. The quota method involves setting up an exercise regimen that progressively becomes more and more strenuous according to a fixed pattern rather than how the patient feels. For instance, a patient might start walking one-half block each day and then increase this by one block each week. With the quota system, the patient would complete these exercises according to the plan whether or not the pain was better or worse. In this approach the pain is essentially taken out of the equation, since the exercises are designed to be safe for a given chronic pain condition. It can be helpful to remind the patient that, "hurt does not equal harm". Each time the quotas increase there may be a slight (and temporary) increase in pain due to the reconditioning (not injury). The quota-system approach has been shown to be very effective in university pain program settings. Unfortunately, it is used much less frequently in routine physical therapy practice. The quota system will be discussed in more detail subsequently.

PRINCIPLES FOR A CHRONIC PAIN RECONDITIONING PROGRAM

The following sections discuss how to approach a conditioning program in the treatment of chronic pain. The general principles include using the quota system, having an aerobic component to the program, and making sure that family and friends support the patient in a proper manner. A multidisciplinary pain program with reconditioning also includes cognitive behavioral therapy and medication management (often with detoxification) as discussed previously. It is important for the QME to have an understanding of this type of treatment and to be able to differentiate it from other types of "physical therapy". It is rare that patients have

gone through this type of program prior to being seen by the QME. Rather, the patient has simply complete some routine physical therapy and other "multidisciplinary" treatment provided across different venues in an unstructured fashion.

The Quota System

As mentioned previously, the quota system is a specialized approach to exercising (or to any activity for that manner) that involves working to a specific quota rather than being guided by the pain. It is important that this be done initially under the supervision of a physician and qualified physical therapist. The quota system can be applied for any type of exercise or activity that the patient wishes to increase. In setting up a quota system for an exercise program the patient starts with what are called baseline measurements. In developing a baseline the patient exercises until pain or fatigue stops him or her over three consecutive sessions. An example of this might be doing repetitions of a strengthening exercise. The patient may only be able to do four repetitions on the first session, six repetitions on the second session, and five repetitions on the third session. Once the three baseline measures are taken, an average is then determined. In the example above, the average would be five repetitions for the particular exercise (4 + 6 + 5 = 15, divided by 3 = 5).

The initial quota is then set at 70 percent of the baseline average. Therefore the patient would begin the program for this particular exercise at an initial quota of three repetitions (70 percent of 4 = 2.8, and round off to the next highest number). Setting the initial quota at 70 percent of the baseline average ensures that the patient will be successful in meeting the quota. Once the initial quota is established, the patient is instructed to do that number of repetitions regardless of the pain. The same type of quota can be set for such diverse things as walking distance, swimming distance, amount of time on a stationary bicycle, and any exercise that involves repetitions. A baseline measure is always taken over three or four sessions and then 70 percent of the average constitutes the initial quota.

It is helpful for patients to chart their progress for each exercise. The x-axis can be labeled "exercise session number" and the y-axis is the number of repetitions (or other exercise variable) required to meet the quota. This gives a visual record of progress as well as the quota that is required for the specific exercise session. It is also helpful to chart the "target" value (the quota) and the "actual" amount of repetitions for each exercise session. These are used to document the patient's quota target for the exercise and the actual amount of the exercise done for that session.

The quota system forces a patient to exercise to a certain, safe level while removing pain from the treatment equation. In addition, the quota system forces the patient to use proper pacing techniques. If patients are allowed to exercise depending upon how they are feeling that particular day, one often sees progress

values that are very inconsistent. On a "good" day when the patient is in less pain, he or she will "go for it" and do much more than is recommended. Of course, most of the time, this results in a severe flare up in symptoms causing the patient to miss subsequent exercise sessions and regress to a lower quota value upon returning. This pattern (over-doing exercises, exacerbation in symptoms, and "crashing") is very frustrating for the patient and can lead to a treatment dropout.

A question that must always be dealt with is how rapidly to increase the quotas. This is usually determined by the supervising physician or physical therapist and will depend on the type of exercise as well as the chronic pain problem. In addition the therapist will take into account how physically deconditioned the patient has become.

Pacing

The concept of pacing is built into the quota system of exercise. Pacing is a technique for approaching any activity such that the chronic pain is kept under reasonable control. Pacing involves a gradual increase in activity according to a systematic plan. This approach can be used for exercise as well as any other activity. For instance it might also involve doing some activity and then taking regular breaks throughout the day to prevent acute exacerbations of the pain.

As discussed previously, a common pattern seen in people with chronic pain is the "overdo and crash" pattern, whereby the patient begins a day with minimal pain and subsequently engages in so many activities that he or she is literally in bed with pain for the two or three days following. This pattern may then continue such that the patient is continually overdoing activities when he or she begins to feel good and then "crashing" for several days thereafter. This is an unhealthy approach to pain rehabilitation and should be replaced with a "pacing" format. Pacing should not be confused with the concept of "being guided by the pain." Pacing encourages a reasonable amount of activity and exercise, not more and not less. The patient must attempt to do activities and exercise each day while pacing him- or herself.

Aerobic Conditioning

One component of a good exercise program for chronic pain should be aerobic conditioning. This should also initially be supervised by a physician or qualified physical therapist. Aerobic conditioning exercises are those that result in an increase in the uptake and utilization of oxygen. Actual aerobic conditioning occurs when the heart rate reaches a certain level and is maintained at that level for a specific period of time. A rough estimate of a person's target heart rate for aerobic conditioning is the following: Subtract your age from 220 and then take 70 percent of the resulting number. The following formula represents this equation for a forty-five-year-old person: 220 - 45 = 175, then 70 percent of 175 = 123 (the target heart rate rounded off to the nearest whole number).

The quota system can be used for aerobic conditioning as well. First the patient must choose one or more aerobic conditioning exercises under the supervision of his or her physician. This might include such activities as brisk walking, swimming, or a stationary bike. The baseline is established by doing the exercise until the patient must stop due to increased pain or fatigue. The patient should be reminded that he or she should not attempt to "push it" when the baseline is being established. After doing three or four sessions of a baseline take the average and multiply this by 70 percent. This will give you a beginning quota for the aerobic conditioning program. For instance if the patient can initially do an average of ten minutes on the stationary bicycle, then the initial quota would be seven minutes to start. A typical quota system for this type of exercise would be to start at seven minutes twice per day and increase the bicycle sessions by one minute every fourth session. This quota system will gradually increase the patient's tolerance on the bicycle and increase the amount of aerobic conditioning that he or she is able to obtain. This could be done until the patient has reached a reasonable goal, which might be getting to a target heart rate for twenty minutes on the stationary bicycle three times per week. A similar system should be set up for other aerobic conditioning exercises, such as swimming and brisk walking.

Aerobic conditioning is an important part of a chronic pain rehabilitation program, not only for its conditioning component but also to help decrease stress, increase the fluidity of movements, and decrease the overall pain.

Family, Friends, and Exercise

The last aspect of an exercise program is the patient's psychosocial environment, which includes family, friends, and work associates. The psychosocial environment is an important element in any chronic pain rehabilitation program. Consider the following case example, which is not uncommon in patients with chronic back pain:

Case Example

A forty-six-year-old woman had undergone three previous spine surgeries. She had a developed chronic back-pain syndrome and was attempting to increase her functioning through many of the principles presented in this book. As she started to attempt more activities, she noticed that her husband would make comments such as "why don't you take it easy," "you shouldn't be doing that," and "you need to get more rest." She noticed that he was becoming overly protective and would often express to her that attempting to increase activities would certainly lead to injury. She noticed a similar reaction from many of her friends who knew she had a long-standing back pain problem.

In this situation the patient's family and friends misunderstood her back pain problem and the importance of the rehabilitation approach. The patient was instructed to educate them as to the importance of a quota-system-based increase in exercise and activity. She was also instructed to give them specific guidelines not to respond to her pain behaviors and to encourage her for any increase in activity that was observed. This example underscores that guidelines are needed in terms of dealing with family and friends when embarking on an exercise program or increasing one's activities. Specific guidelines are as follows:

Pain Management, Family and Friends

Family and friends need to be educated that increasing activities will not result in any harm and that it is the healthiest thing the patient can do for the chronic pain problem.

Have the patient instruct family and friends not to respond to pain behaviors but rather to provide encouragement for increasing activities or exercise.

Have the patient tell as many people as possible about his or her plan to increase activities and the exercise program. This type of public commitment will ensure that the patient follows through with the quota-based exercise conditioning program.

One good way to ensure that the patient follows through with the exercise program is to have him or her get an "exercise buddy" (a family member or friend). The "buddies" then set up a regular schedule, and exercise in pairs. This helps to hold the patient accountable to the exercise program and the exercise partner.

SPINAL CORD STIMULATION (SCS)

Overview

Spinal cord stimulation is a reversible pain treatment that utilizes low-voltage electrical pulses (termed "neuromodulation") to manage chronic, intractable neuropathic pain. It is based upon the gate control theory of pain as discussed in Section I of this course. Consistent with the gate control theory of pain, spinal cord stimulation attempts to "override" a pain signal with another type of sensation. In fact, the golden rule of spinal cord stimulation is that stimulation-induced paresthesias must cover the painful area for effective pain relief.

Neuropathic pain is a specific type of pain that is initiated by damage to, or dysfunction of, the nervous system. In some cases, actual nerve damage is not always identifiable even though the neurologic symptoms are present. Neuropathic pain is often described as burning or shooting. Neuropathic pain can be extremely difficult to manage and a certain proportion of patients fail to respond to medication and other pain management treatments. These patients are the target population for spinal cord stimulation.

Spinal cord stimulation involves a trial period during which the intervention is attempted for five to seven days without permanent implantation. Based upon the results of the trial period, permanent implantation may be recommended. Research has demonstrated that psychological factors are powerful predictors of a patient's long term response to spinal cord stimulation. Therefore, pre-implant psychological screening is recommended by the evidenced-based literature. In fact, it is required by Medicare and most insurance carriers as a condition for undergoing the pre-SCS trial. As such, the pain practitioner or behavioral health specialist (psychologist) is intimately involved in the spinal cord stimulation treatment process.

MEDICAL CONDITIONS ASSOCIATED WITH NEUROPATHIC PAIN

Spinal cord stimulation is often considered as a pain management treatment in the following conditions:

Medical Conditions Appropriate for Spinal Cord Stimulation
Failed back surgery syndrome (usually with leg pain greater than back pain) Complex regional pain syndrome Postherpetic neuralgia Trigeminal neuralgia HIV-associated pain Pain after amputation (phantom limb pain) Pain after stroke Multiple sclerosis Cancer-related pain Diabetic neuropathy Spinal cord injury

Of these medical conditions, the most common are failed back surgery syndrome, complex regional pain syndrome, and postherpetic neuralgia.

Failed back surgery syndrome is a general term to describe patients who are left with back and/or leg pain after spine surgery. In general, spinal cord

stimulation may be suitable for patients with radiating leg pain greater than back pain (or arm pain after cervical spine surgery). Studies suggest that between 15% and 40% of patients will have chronic back and/or leg pain after lumbar spine surgery.

Complex regional pain syndrome is a neuropathic pain condition that is not well understood. Diagnostic criteria include the following:

CRPS Diagnostic Criteria
An initial injury such as a fracture or need for immobilization (e.g. after a stroke) for Type I and a known nerve injury for Type II.   Spontaneous pain or evoked pain (termed allodynia/hyperalgesia) that is not limited to the area of a single peripheral nerve and is disproportionate to the initiating event.   Past or present evidence of swelling (edema), skin blood flow abnormality, or abnormal sweat gland (sudomotor) activity in the region of the pain since the initiating event.   Exclusion of a medical condition that would explain the pain and dysfunction.

Treatment of complex regional pain syndrome (CRPS) most often involves managing the pain while physical therapy targeting restoration of function is completed. In the early stages, controlling the pain may include stellate ganglion blocks and medications. As the condition becomes chronic, psychological treatment focusing on quality of life and other issues, as well as spinal cord stimulation, are often indicated. CRPS affects the upper extremity 44% to 61% of the time and the lower extremity 39% to 61% of the time.

Postherpetic neuralgia can occur after an outbreak of the herpes zoster virus. Herpes zoster is also known as shingles and is caused by a reactivation of the varicella zoster virus that has been latent since the primary infection (chicken pox). Initial treatments include antivirals, medications for neuropathic pain, and opioids. If not successful, spinal cord stimulation may be indicated. The lifetime risk of herpes zoster is 10% to 30% with the incidence increasing with age. Approximately 20% of those older than 50 years old will experience post herpetic neuralgia 6 months after the onset of herpes zoster rash.

ODG and CA-MTUS Guidelines for SCS Implantation

The ODG and CA-MTUS include the following indications for simulator implantation:

Failed back syndrome (persistent pain in patients who have undergone at least one previous back operation):

> SCS is more helpful for lower extremity than low back pain, although both stand to benefit, 40-60% success rate 5 years after surgery.

> SCS works best for neuropathic pain. Neurostimulation is generally considered to be ineffective in treating nociceptive pain.

> The procedure should be employed with more caution in the cervical region than in the thoracic or lumbar.

Complex regional pain syndrome (CRPS)/Reflex sympathetic dystrophy (RSD), 70-90% success rate at 14-41 months after surgery.

Post amputation pain (phantom limb pain), 68% success rate.

Post herpetic neuralgia, 90% success rate.

Spinal cord injury dysesthesias (pain in lower extremities associated with spinal injury).

Multiple sclerosis. Pain associated with multiple sclerosis.

Peripheral vascular disease (insufficient blood flow to the lower extremity, causing pain and placing it at risk for amputation), 80% success at avoiding the need for amputation when the initial implant trial was successful.

THEORY OF SPINAL CORD STIMULATION

The concept of spinal cord stimulation was initially introduced by Shealy and colleagues more than 40 years ago (Krames, 2002). It was based upon the gate control theory of pain developed by Melzack and Wall (1965). Spinal cord stimulation is thought to decrease the perception of pain by electrically stimulating the large diameter afferent nerve fibers in the dorsal columns of the spinal cord. This causes a tingling feeling (paresthesias) and inhibits transmission of the pain signal to the brain (by interrupting the neuronal signal flowing through the spinothalamic tracts). As such, the stimulation from the SCS overrides the pain

signal traveling from the extremities to the brain and also replaces the pain sensation with one of tingling.

SPINAL CORD STIMULATION COMPONENTS

A spinal cord stimulator device includes three implantable components. If permanent implantation is recommended, the entire system is internal.

- A pulse generator
- An extension cable (the wire connecting the lead to the generator)
- A lead

The pulse generator. The pulse generator is the battery of the spinal cord stimulator that provides the low-voltage electrical pulses for stimulation. Certain aspects of the pulse generator are programmed by the physician including the amplitude, pulse width, and pulse rate. The amplitude is the strength of the electrical stimulation measured in volts which determines the level of tingling or paresthesias experienced by the patient over the painful area. The pulse width is measured in microseconds and determines the duration of the stimulation and how wide an area the paresthesias cover. The pulse rate is the number of electrical pulses per second measured in Hertz. Once the optimal parameters are determined by the pain management physician, the patient can control various parameters within the limits set by the physician. All of the control is done by remote control.

Prior to a few years ago, the pulse generator had a limited battery life and had to be replaced after approximately three to five years, depending on patient use. Of course, this necessitated additional surgery. Recently, rechargeable units have been developed and can last up to ten years, or more. Most of the units implanted currently are rechargeable units. Once the system is implanted, it is operated by the patient through the use of an external control unit (similar to a remote control). The system can be adjusted by the patient as well as turned off and on. The pulse generator is implanted under the skin either in the lower abdomen or buttock area.

Implanted SCS System
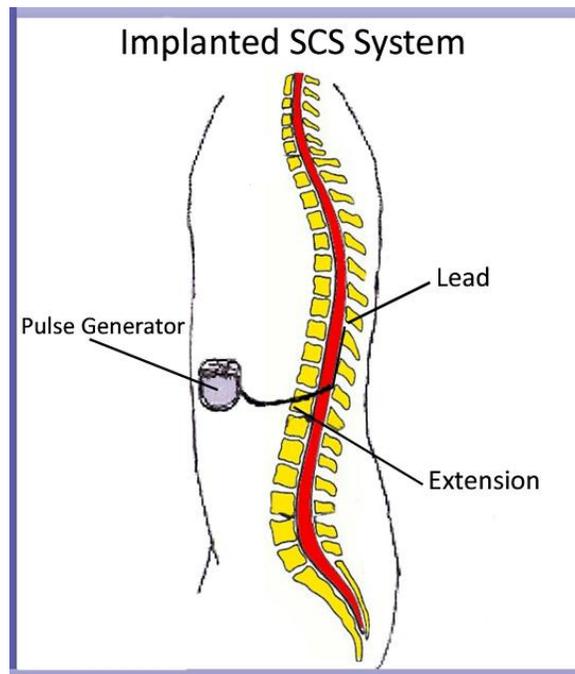
The extension cable. The extension cable connects the pulse generator to the lead.

The lead. The lead is connected to the extension cable and includes the electrodes that deliver the electrical stimulation to the dorsal columns of the spinal cord. The lead is positioned in the epidural space on the posterior aspect of the spine. Lead placement is determined to maximize pain coverage as determined by the dermatomes associated with the spinal nerves. A dermatome is an area of skin associated with a pair of dorsal roots from the spine. The lead will often cover more than one vertebral level of the spine to cover the painful area. The adequacy of paresthesia coverage of the painful dermatomes determines the success of the spinal cord stimulation treatment. Dermatomes are different regions of the body that are mainly supplied by a single spinal nerve. There are eight cervical (one for the head, and one for each cervical vertebra), twelve thoracic, five lumbar and five sacral spinal nerves. The figure shows approximately which dermatome is associated with each spine level.
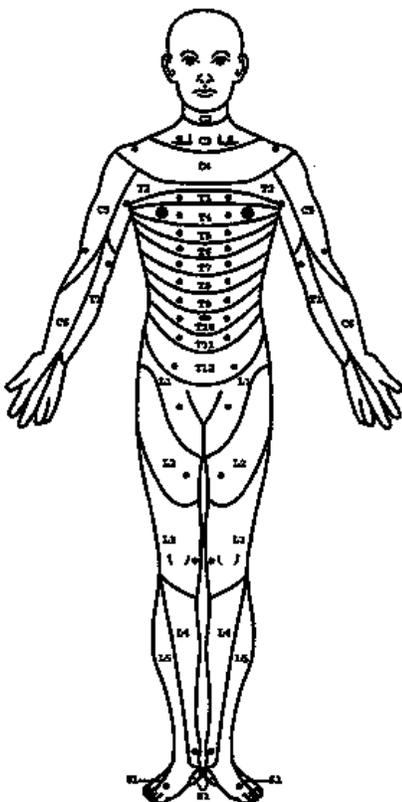
There are two types of leads: percutaneous and paddle (also called neurosurgical) leads. The percutaneous leads are inserted through the skin using a large diameter needle and the paddle leads are inserted surgically using an open procedure. The

percutaneous leads are round and inserted through a hollow needle (called a Tuohy). The Tuohy needle is first positioned (tunneled) to the desired location in the epidural space through the use of fluoroscopy (x-ray). The lead is then threaded through the Tuohy needle for placement. The advantage of a percutaneously lead is that it is less invasive and require less operating room time. The disadvantage is that, relative to surgically placed leads, there is a greater risk for "migration" or movement of the electrodes after placement. This can be a problem since lead placement is done based upon the patient's report of pain relief and "coverage" of the painful area by the paresthesia sensation. If the lead moves (e.g. weeks after placement) the pain control might be lost requiring another surgery. Also, percutaneous leads generally have less favorable stimulation characteristics.

Surgically placed leads are placed through a small laminotomy/laminectomy (removal of part of the lamina of the vertebra). This procedure requires that a neurosurgeon or orthopedic surgeon be involved and is more extensive than placement of the percutaneous lead.

PHASES OF SPINAL CORD STIMULATION

The phases of a spinal cord stimulation intervention can be seen in the Figure. The behavioral health practitioner is an important participant in this process.

As discussed in the Bala, Riemsma, Nixon and Kleijnen (2006) review of the literature, spinal cord stimulation is part of an overall treatment strategy and is used only after the more conservative treatments have failed. The authors go on to discuss that "a thorough psychological assessment and trial stimulation is required prior to permanent implantation of the device." The pre-trial and implant psychological screening is required by Medicare as well as other insurance carriers. Pre-implant psychological screening is recommended (or required) since psychological factors have been found to be predictive of long term success. These predictor variables and suggestions for a pre-screening psychological assessment battery will be discussed subsequently in greater deal.

SCS TEST STIMULATION PHASE

If the patient "passes" the psychological screening, the spinal cord stimulation test phase is undertaken. The spinal cord stimulation test phase generally involves placing temporary percutaneous leads with an external pulse generator to help determine whether the patient is a candidate for a permanent implantation. The

test phase allows the patient to utilize the spinal cord stimulation system for between five and seven days.

The SCS test stimulation phase begins with percutaneous placement of the temporary leads. These are connected to a temporary external pulse generator. This procedure is often done in an outpatient surgery center. To complete the lead insertion and placement, the patient is sedated, but not unconscious. The placement of the temporary leads takes between 45 minutes and two hours. To correctly position the electrode leads, the spinal cord stimulator pulse generator is activated during the procedure and the patient assists in guiding electrode lead placement. The patient will tell the physician when he or she is feeling the paresthesia and whether or not it is "covering" the painful area. Once the temporary system is in place, the patient can utilize it over the next five to seven days. During this time, the stimulation parameters can be changed to optimize pain control. The spinal cord stimulation trial allows the patient to determine whether permanent implantation is a reasonable course of action.

In clinical practice and in the research literature, successful test phase stimulation is defined as at least 50% reduction in pain. Most often in a clinical setting, the patient will return to the physician after the trial phase and simply be asked one question, "did you obtain 50% or better pain relief during the trial?" Based upon the patient's answer to this single question, permanent implantation may or may not be recommended. From a biopsychosocial standpoint, there are several problems with this approach in terms of predicting long term response to the spinal cord stimulation intervention. These are as follows:

Memory for pain is notoriously inaccurate. Even so, the patient is being asked to summarize seven days of trial use of the spinal cord stimulator by answering a single question. One can imagine that if the patient happened to have a "good day" just prior to the follow-up visit, while having six prior days of no response to the spinal cord stimulator unit, the answer to this follow-up question might be "yes."

Determining actual pain relief. The criteria of greater than 50% pain relief as determination for permanent implantation does not take into account other variables that are important to long term chronic pain management. These include, but are not limited to: an increase in overall function including activities of daily living (ADL's), a decrease in the use of pain medication, improvement in mood, improvement in the patient's quality of sleep, etc. Certainly, if an intervention is to be determined "successful" in terms of chronic pain management, all of these variables should be impacted in some way.

Patient honesty about the trial results. Some research has indicated that the small percentage of patients may not be truthful in discussing their actual response to the spinal cord stimulator trial. These patients believe that the permanently implanted unit will somehow be "stronger" or more effective than the

trial unit. Therefore, even though they have had an inadequate response, they will tell the physician that they did receive greater than 50% pain relief in order to obtain the permanent spine cord stimulation system. Not surprisingly, they will then request that the unit be removed within the following year due to lack of efficacy.

Placebo and expectancy effects. Asking the patient about his or her response to the spinal cord stimulation trial does not take into account expectancy or placebo effects. Again, the placebo response is well documented in various treatment approaches. Since spinal cord stimulation is often considered an "end stage" treatment, patients' expectations for success are very high. Therefore, one might assume that strong factors are operating to support the expectancy and placebo effect.

As will be discussed subsequently, there are methods that can be used to enhance the predicted validity of the spinal cord stimulator trial. Unfortunately, these are rarely used in clinical practice even though they are well-researched. This is an area where the behavioral health practitioner can have a significant impact.

PERMANENT IMPLANTATION PHASE

If the SCS stimulation trial is determined to be successful, permanent implantation can proceed. As previously discussed, there are two types of leads: percutaneous leads and neurosurgical leads. The percutaneous leads are almost always used during the spinal cord stimulator trial. They are also the most common type of lead used for permanent implantation. The neurosurgical leads require a partial laminectomy (removal of part of the lamina) and this must be done by a neurosurgeon or orthopedic spine surgeon. Clearly, the percutaneous leads are less invasive. The patient should understand what type of procedure is recommended relative to permanent lead placement.

During the permanent implantation procedure, the lead is again placed to maximize "coverage" of the painful area. Again, this does not remove the pain, but simply "overrides it" or "covers it" with another sensation. This sensation is described as a paresthesia or "tingling sensation." The patient should have a good understanding that this is the purpose and desired outcome of spinal cord stimulation treatment and that it is not designed to "take the pain away." Some patients find the paresthesia sensation uncomfortable and intolerable. This should be quickly identified during the trial phase. In many cases, the lead that was used during the trial phase is retained and simply anchored to the interspinous ligament. The lead is then connected with the extension wire to the pulse generator. Again, if the lead is actually replaced, the patient is conscious during the procedure in order to assure proper placement.

Once final placement is assured, the lead is connected to the pulse generator by the extension wire. This is completely internal and the extension cable is tunneled

under the skin. The pulse generator is implanted just under the skin either in the abdomen or upper buttock area. The insertion of the permanent lead and implantation of the pulse generator takes approximately two to three hours and is generally done on an outpatient basis. An important, but often overlooked issue is placement of the pulse generator. For instance, if the patient generally sleeps on his or her right side, the generator should be placed on the left side. Also, placing the generator near the belt line should be avoided. The behavioral health practitioner can help insure that the patient addresses these issues with his or her pain physician.

After permanent implantation, the patient will follow-up to adjust stimulation parameters and assess pain control. The frequency of visits during the first year is dependent on physician preference. Once adequate pain control is established, the frequency of follow-up visits is faded.   Combining cognitive behavioral pain management treatment with spinal cord stimulation can enhance treatment outcomes.

COMPLICATIONS ASSOCIATED WITH SPINAL CORD STIMULATION

Complications are rare and can be divided into *procedural* complications and *technical* failures. Procedural complications include wound infection, cerebrospinal fluid leaks, dural puncture headaches, and the inability to thread the lead percutaneously into the epidural space. Technical failures include lead migration and fracturing, unwanted stimulation, inadequate paresthesia coverage, and pain over the pulse generator battery implantation site. According to the Health Technology Literature Review (2005) technical and procedural complications are as follows (most frequent to least frequent):

- Lead migration
- Lead breakage
- Infection
- Hardware malfunction
- Unwanted stimulation
- Hematoma
- Paralysis
- Cerebrospinal fluid leak
- Pain over the implant
- Allergic reaction
- Skin erosion
- Loose connection
- Battery failure
- Other

Contraindications to Spinal Cord Stimulation

Contraindications to spinal cord stimulation treatment currently include the following:

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Contraindications to Spinal Cord Stimulation

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The presence of other stimulation devices with sensing capacities such as pacemakers or implantable cardiac defibrillators

Severe diseases likely to interfere with neural modulation procedures such as coagulopathies and immunodeficiency diseases

Those patients that might require an MRI in the future (according to the manufacturer's website, MRI's cannot be done on a patient who has an SCS system implanted)

Failure of the psychological pre-implant screening (e.g. psychiatric issues, a fully developed chronic pain syndrome, substance abuse issues, a patient's inability to understand and control the device, etc.).

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PRE-IMPLANT PSYCHOLOGICAL SCREENING

Purpose: Why is it so Important?

The long term success of spinal cord stimulation is somewhat disappointing. As discussed by Beltrutti et al. (2004) in an extensive review of the literature, "it is known that, in spite of meeting appropriate clinical criteria for spinal cord stimulation (SCS) and having undergone flawless procedures, a significant number of patients who fail the therapy continue to exist" (page 204). Beltrutti et al. (2004) go on to state that: "to improve treatment outcomes of SCS, seems to be essential to perform psychosocial evaluations on all persons clinically indicated for SCS to exclude those patients, who most probably, on a psychosocial level, will fail the procedure" (page 205). As discussed by Doleys (2006), "however, reviews of the literature have indicated a reported loss of pain relief in up to 50% of patients at one to two years post-implantation, despite a successful trial period of stimulation" (page 1). Doleys goes on to state that "in one study, 100% of patients reported success at 16 months, but only 59% still had these results at 58 months. Psychological factors may play an important role in understanding this apparent loss of efficacy, particularly in the case of a technically adequate implant" (page 1). As Doleys discusses, "if a failure rate of 25-50% in patients who had previously undergone trials and implantation of SCS devices is unacceptable, then

an examination of psychological variables is required" (page 1). Of course, this failure rate is not acceptable and increasing success rates is certainly appropriate.

As discussed by Doleys (2006), the use of spinal cord stimulation for chronic pain control is increasing and this is likely due to several factors: First, "many pain management physicians feel that attempting a spinal cord stimulator trial is reasonable in virtually all cases since the procedure is entirely reversible and with minimal risk. Second, "the economic considerations and the reinforcement of being known as a surgeon with experience in these types of implantations cannot be overlooked" (page 2). As such, there is often a discrepancy between a given practitioner's reported outcomes and the evidenced-based literature. As discussed by Doleys (2006, page 2), it appears that the more experienced, published, and outcome-oriented practitioners, although enthusiastic about SCS therapy, are more conservative in their predictions related to outcome. Third, the presence of high profile personalities such as Mr. Jerry Lewis reporting successful results to spinal cord stimulation has clearly heightened the public awareness of SCS therapy. This type of publicity has also, without a doubt, increased patient's expectations regarding the potential benefits of SCS therapy. In fact, Jerry Lewis is so enthusiastic about his response to SCS that many patients will have unrealistic expectations about their likely individual response to this intervention. Lastly, manufacturers of SCS systems aggressively market to the public directly which can further enhance unrealistic expectations.

Given all of these factors, SCS procedures are being recommended more frequently. In addition, patients (and many pain management physicians) are resistant and defensive relative to the issue of pre-implant psychological screening. As suggested by Doleys, the only reason that pre-implant psychological screening is often completed is the fact that it is required by Medicare, many private insurance carriers, and suggested in many evidenced based practice guidelines. Without these requirements, pre-implant psychological screening would likely be done on a very infrequent basis.

Poor patient selection, preparation and management are more likely causes of unsatisfactory long-term response to implantable pain control systems than are technical failure or device complication (Doleys, 2002). Pretrial patient screening seeks to avoid "false-positives" (those implanted that have a poor outcome) and "false-negatives" (screening out those patients who would have benefited from the procedure). The goals of SCS and pre-pump screening, and patient benefits have been summarized by Williams (1996) as:

> Identifying those patients most likely to benefit from SCS/intrathecal pump

> Preventing candidates from undergoing an invasive and costly procedure with poor prognosis for relieving pain

> Aligning rejected candidates with more appropriate alternative treatment

Determining a patient's suitability as a trial candidate depends upon an appropriate assessment of medical, psychological, and behavioral factors. As discussed at length by Doleys (2002), a "positive response" to a pre-implant trial is inadequate to predict a favorable outcome to permanent implantation (page 339):

"As often as not, patients may be approved for a trial not because they evidence features thought to be associated with a positive outcome but rather because they have failed certain other procedures and the pain practitioners may have little else to offer them. In this regard it is important to note that a "positive response" to a preimplant trial while appearing necessary for a positive outcome is not in and of itself sufficient to predict a positive outcome"

COMPONENTS OF THE PRE-IMPLANT BIOPSYCHOSOCIAL SCREENING

As discussed in the literature, the pre-implant screening should include the following:

- a comprehensive clinical interview
- appropriate psychological test battery
- review of available medical records

As long as the testing battery validly assesses the predictor variables, there is flexibility relative to the choice of individual instruments. Certainly, the testing instruments should include those with validity scales and have been validated for use with a chronic pain patient population. In addition, the test instruments should have some research supporting their predictive validity relative to pre-implant and spine surgery outcome.

Clinical Interview and Review of Medical Records

The clinical interview components are very similar to those of a chronic pain assessment. For any behavioral health practitioner who works with chronic pain patients, the components of the pre-implant clinical interview will be quite familiar. Aspects of the clinical interview should include at least the following:

Identifying Information

Presenting Problem and Review of Available Medical Records

Current Symptoms and Level of Function

Work History

Other Medical Problems and History

History of Injuries

Interviewer Observations and Mental Status Examination

Psychosocial Situation

Psychiatric Treatment History

Substance Use and History

Medications

Understanding of the Proposed SCS Treatment

I find that the review of medical records is very useful if they can be obtained. Often, the medical records information is quite discrepant from the history as provided by the patient. The medical records can provide clues about response to previous treatments, the patient's motivation toward improvement, and presence of "red flags" such as doctor shopping and medication overuse. The QME report should have all of this information.

Pre-Implant Pain and Psychological Testing Battery

As discussed previously, there is some flexibility in the choice of pain and psychological tests. Choice of tests should be guided by the following:

Choice of Tests for the Pre-Implant Screening
any test selected for inclusion in the battery should have a research base establishing its use with a chronic pain patient population
at least one or two of the tests should include appropriate Validity Scales
some of the tests should assess chronic pain issues directly
the tests should have some research base establishing the ability to predict long term response to interventional pain management techniques (e.g. pain control implant devices, spine surgery, etc.).

In many cases, there are no studies specifically addressing the predictive validity of a psychological test to predict outcome relative to a spinal cord stimulator or

drug delivery system ("pain pump"). Therefore, results might be extrapolated from research investigating psychological testing and spine surgery outcome.

Some of the more comprehensive tests that include validity scales, and have been validated for the use on a chronic pain patient population include the MMPI-2, the Millon Behavioral Medicine Diagnostic, and the Battery For Health Improvement-2. Aside from these comprehensive instruments that contain validity scales, other tests might be utilized that are especially appropriate to a chronic pain population such as measures of depression, anxiety, coping skills, suicidality, locus of control, etc. The choice of these specific instruments will depend on the preferences of the practitioner.

In addition, tests that have been designed to directly assess pain-related issues are appropriate. These might include the Multi-Dimensional Pain Inventory (MPI), Chronic Pain Coping Inventory, Coping Strategies Questionnaire, McGill Pain Questionnaire, Oswestry Low Back Pain Disability Questionnaire, Survey of Pain Attitudes, Pain Self-Efficacy Scales, among others. Of course, one would not use all of these questionnaires. Rather, it is recommended to select one comprehensive test that includes validity scales along with more specific tests to assess other issues.

SCS PRE-IMPLANT SCREENING CATEGORIES OF ASSESSMENT

According to the evidenced-based research, *Exclusionary* and *Cautionary* factors have been established relative to pre-implant screening. I have modified these for my own use and the categories are listed as follows. In my assessments, I prefer to rate each of these factors along a continuum of negative, mild to moderately influential, or positive and significant. Based upon the data gathered, each of these areas should be easily evaluated.

Categories for Assessment for SCS Screening
Exclusionary Factors Active Psychosis- Major *Uncontrolled* Depression and/or Anxiety- Active Suicidal or Homicidal Behavior- Serious Alcohol or Drug Addictions- Significant Medication Seeking Behavior- Serious Cognitive Deficits- Significant Somatization Disorder or Features- Inability to Manage the Implantable Device- Presence of a Significant Chronic Pain Syndrome- Alternative Therapies With A Risk Benefit Ratio Comparable or

Better Than SCS Remain To Be Tried-

Cautionary Factors

Unusual Pain Ratings-
Certain Personality Disorders-
Certain Personality Traits-
Abnormal Psychological Test Findings-
Severe Sleep Disturbance-
An Invalid Concept of Pain or Pain Treatment-
Inadequate Support from Spouse-
Lack of Social Support-
Involvement in Pain Related Litigation-
Unresolved Workers' Compensation Issues-
Unrealistic Expectations about Treatment-

PATIENT CATEGORIZATION: A "SCORECARD" APPROACH

There are no hard and fast rules regarding screening decisions. The decision is based upon clinician judgment and the objective test data. The use of a "scorecard" type of system can aid the clinician in making a decision relative to pre-implant screening results. This also provides some objectivity and consistency in determining appropriateness for SCS treatment across patients. Lastly, it adds objectivity to the assessment and demonstrates a knowledge of the evidence-based research in this area.

A categorization system developed by Heckler, et al. (2007) and others is helpful in conceptualizing pre-implant screening results. The categorization system places patients in one of four categories as follows:

Categorization System for SCS Screening

Green-No biopsychosocial factors that would preclude a successful long term clinical response to the spinal cord stimulation treatment and "cleared" for SCS trial.

Yellow I-The patient is cleared to undergo the SCS trial. If found to be a reasonable candidate from a medical perspective, and permanent implantation proceeds, the patient is recommended to undergo a brief trial of cognitive behavioral treatment-coping skills training. This treatment is approximately five to ten sessions of CBT-SCT treatment focusing on helping the patient enhance his or her response to the SCS intervention.

Yellow-II-These patients might be recommended for pre-implant cognitive behavioral intervention to address issues identified in the evaluation. Again, this is a brief intervention of a highly structured nature. It might include such things as developing accurate expectation for the spinal cord stimulator treatment, working in conjunction with the physician to help decrease the patient's use of medications, teaching the patient cognitive behavioral and coping skills techniques relative to pain management, and/or to work on compliance and motivation issues.

Red-Patients in this category were found not appropriate for the implant trial or permanent implantation. This would be due to the number of factors found that were predictive of a poor response. Patients in this category also demonstrate characteristics suggesting they would report a positive response to the SCS trial, undergo permanent implantation, and then request that the system be removed after three to six months due to lack of benefit. In these cases, the patient would have undergone two surgeries that could have been avoided. Patients in this category might be recommended for alternative non-invasive pain management treatment if appropriate.

ENHANCING THE VALIDITY OF THE PRE-IMPLANT TRIAL

As discussed previously, there are several factors that can invalidate the results of the pre-implant trial even in the properly psychologically screened patient. These include the patient's inaccurate assessment of pain relief, lack of assessment of functional variables, not being truthful about true pain relief, and expectancy effects. The following pre-implant interventions can help increase the validity of the trial results.

Even though a patient is found to be a reasonable candidate from a psychological perspective, he or she will often still have questions about the treatment approach. These questions can be discussed with the patient along with suggestions about how to get answers prior to the trial. I will discuss with patients that it is important that they get all of their questions answered prior to undergoing the trial. I have had more than one patient who was cleared psychologically decide against the SCS intervention after gathering more information (full informed consent).

As discussed previously, it has been demonstrated in the literature that a certain percentage of patients will purposely overestimate their response to the SCS trial in an effort to get the permanent implantation. The reason given is that they believe the permanent device will somehow be more powerful or effective than the SCS trial. I will go over these research findings and tell patients that they should be completely honest regarding the level of pain relief during the trial. I also tell them that the pain relief they obtain during the trial (or lack thereof) is what they can expect with permanent implantation.

I also warn patients about "expectancy" and "placebo" effects during the spinal cord stimulator trial. In order to help patients complete an objective assessment of their response to the spinal cord stimulator trial, I recommend that they keep a pain diary at least one or two weeks <u>prior</u> to the trial and continue it throughout the trial period. This helps patients assess their actual response to the spinal cord stimulator.

As discussed previously, one of the commonly overlooked areas in implantable pain therapies is adequate assessment during the trial period. As suggested by Doleys (2002) and others (see references), a more valid and effective approach is to monitor specific variables just before the trial and during the trial to gauge the actual impact of the intervention. Variables to be monitored might include pain ratings, function, medication intake, mood, quality of sleep, etc. The factors can be monitored very specifically through the use of a pain, medication and activity "diary". These diaries have been used in chronic pain research and treatment for decades and simply involve having the patient keep pain ratings (e.g. 0-10 or VAS four times per day), medication consumption, mood (0-10), activity/function, etc.

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