CHRONIC PAIN PRIMER

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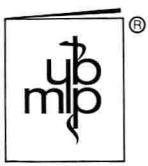

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Chronic Pain Primer

To MARY

and

MARY
LINDA
DIANE
JULIE
MATTHEW
MICHAEL

God whispers to us in our pleasures, speaks in our conscience, but shouts in our pains. . . .

C. S. Lewis
The Problem of Pain

Preface

IN THE LAST 10 years there has been a resurgence of investigation into the problems of both acute and chronic pain, resulting in new terminology, new concepts and some new forms of treatment. As one result of these developments, many technical articles and a new journal devoted to the diagnosis and management of pain have become available for specialists in anesthesia, neurosurgery and psychology, those who undertake the more complex antalgic procedures. However, a need has existed for a text directed to the primary care physician, the nurse assistant and the paramedic that would put these newer concepts into a clear and understandable form. The *Chronic Pain Primer* attempts to fill this need.

The attitude of physicians on how to treat patients with chronically painful disorders has changed dramatically during this decade. Chronic pain has become a disorder to be treated as well as a symptom to be investigated. As a result, clinics and medical centers have emerged which focus exclusively on the treatment of one or more of the varieties of chronic pain. Some of these pain treatment centers with large, multidisciplinary staffs treat patients with any chronic painful disorder, no matter what the underlying cause, and often they treat acute pain problems such as those from herniated disks or cancer. The more specialized centers devote themselves exclusively to such conditions as headache and low back pain.

This book focuses on pain therapy from the neurosurgeon's perspective and also provides insights into the psychological factors affecting chronic pain patients. In addition, it gives explanations of the methods of pain treatment applied to various parts of the nervous system. General concepts of pain anatomy and physiology, as well as the general technical principles of certain therapeutic modalities, are analyzed. The author assumes that the reader has some knowledge of medicine, but an attempt is made

to avoid specialized terminology so that the primary care physician, the nurse, the physical and vocational therapists, the medical resident and the student of any of the fields of medical care can gain a clearer understanding of current chronic pain therapy.

The increased activity, in the last decade, in studying the anatomy and physiology of pain perception in the nervous system was caused in part by the clinical application of electrical stimulation to chronic pain problems and by new interest in the Oriental concept of acupuncture for the purpose of anesthesia. In addition, several conceptual changes regarding the treatment of chronic pain from the various perspectives of neurosurgeon, anesthesiologist, psychiatrist and psychologist have come together almost coincidentally during this period.

From the neurosurgeon's standpoint the change in perspective began when it was demonstrated that electrical stimulation of certain parts of the nervous system can relieve various types of chronic pain. Stimulation of the spinal cord, peripheral nerves or skin has not been the panacea of pain relief that it was originally thought to be, and acupuncture has not yet been demonstrated to produce other than psychological anesthesia. However, recent investigations have produced new concepts and new methods that are promising. Transcutaneous stimulators are now used to treat many forms of pain, particularly that caused by musculoskeletal disorders, both acute and chronic, and they have become part of the therapeutic armamentarium of every physical therapy department and every pain treatment center.

On the other hand, surgical attempts to relieve chronic pain have usually involved severing some sensory fiber tracts in nerves, spinal cord or brain, and thus always produce a permanent alteration in the patient's nervous system. Stimulation, on the other hand, does not in itself cause damage to the nervous system. Since recent technological advances have allowed safe approximation of electrode tips to ordinarily inaccessible parts of the nervous system, stimulation to relieve pain has an advantage over destructive surgical procedures.

Anesthesiologists became involved as a result of their familiarity with local and spinal anesthesia for surgical procedures. In cases where metastatic cancer is the cause of pain, it is far easier to inject a nerve-destroying chemical into the spinal canal than to

subject a dying patient to a major surgical procedure in order to sever nerve roots. As their success in relieving the pain of terminal cancer victims increased, anesthesiologists applied the same techniques to chronic pain arising from benign causes such as spinal arthritis and disk problems. The application of these injection techniques has significantly reduced the number of surgical procedures being carried out on patients with painful disks and other spinal disorders.

Psychiatrists and psychologists have long been interested in the physical effects of any emotional state that is persistently disturbing, and chronic pain has therefore been in the focus of their attention for many years. As technology advanced it became possible to measure changes in skin resistance to gentle electrical currents, and to monitor the changes in muscle tension (EMG) and brain waves (EEG) during stress. Although the EEG has not gained wide acceptance as a reliable feedback technique for stress reduction, and skin resistance has been more a diagnostic than a therapeutic tool, the muscle relaxation techniques using electromyographic biofeedback have been mainly responsible for bringing the psychiatrists and psychologists into the pain treatment center as full-fledged partners. Biofeedback is not the sole form of therapy used by these practitioners; often the most important factor in relieving a patient's chronic pain is the change in his attitude and his social relations with others brought about by more traditional psychotherapeutic methods.

The current approach to the treatment of chronic pain has reunited those physicians who utilized what are considered to be traditional organic forms of treatment with psychologists and psychiatrists, who traditionally approached the problem from a purely mental viewpoint. Added to these practitioners are the nurses, the physical therapists and the social and vocational rehabilitation therapists, all of whom form the nucleus of a pain treatment team. It is hoped that all those who care for the chronic pain patient will find here a clear summary of the present state of the art.

I am grateful to Oscar Sugar for reviewing the manuscript and for his invaluable suggestions and encouragement and to Kim Kolinski for her excellent artwork.

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1 / The Psychology of Chronic Pain

PERHAPS HALF of the misery suffered from chronically painful disorders is psychological. This is not to say that in half of all patients with chronic pain the pain is psychological in origin. Although purely psychogenic pain is a real and frustrating problem, it affects only a small percentage of the patients who suffer chronic pain. In the great majority of cases the chronic pain syndrome began with some organic disorder.

When faced with unrelenting pain, even the most stalwart and stable mind can falter. Chronic pain changes any sufferer's personality to a greater or lesser extent. Those afflicted lose some of their ability to respond to their surroundings. They may concentrate less on interpersonal relationships with relatives, other loved ones and business associates than on the pain itself. Relationships then become troublesome rather than joyful. Routine activities are neglected.

In an acute case, where a painful process becomes dominant for whatever organic reason, the person so afflicted may initially lose his zest for life. As the distress is prolonged over days, weeks or months, the sufferer becomes withdrawn, moody, irritable and eventually depressed to the point where life's goals and responsibilities are completely forsaken. These psychological hallmarks of chronic pain are characteristic, whatever the origin of the pain process and whoever the sufferer. The psychological components of the patient's pain problem need as much attention therapeutically as the organic portion. To advise and treat patients afflicted with chronic pain, the physician must gain some insight into the origin of the psychological aspect and its effect on the life of the patient and on the lives of the persons intimately involved with the patient.

Neither the mental mechanisms nor the purely organic brain mechanisms of the psychological aspects of chronic pain are quite

clear. It is known that depression is the psychological end result of any chronically painful disorder. Unfortunately, many of the drugs used in the past to treat patients with chronic pain problems only deepened the patient's depression. Tranquilizers were prescribed with the good intention of allaying an agitated fear of the pain or its cause, but they often produced a mental withdrawal during which the sufferer concentrated solely on the miserable, distressing pain. Some drugs for treatment of chronic pain sedate part of the nervous system and thereby reduce the pain to a tolerable level. However, the patient leads a drugged existence or sleeps most of the time. The trend of current therapy for chronic pain has been away from the tendency to overdose a patient with an excessive array of potent sedating or depressing drugs.

Research on chronic pain as a psychological problem has concentrated on the analysis of mechanisms, both organic and psychological, that lead to the depression accompanying chronic pain. The mental state characteristic of chronically painful disorders appears to arise from two broad sources. The first source is based on the anatomy and physiology of the nervous system (see Chapter 2) and is best described as persistence of pain. The second source is related to the patient's thought processes and therefore more closely approximates a purely psychological entity. This source is the sufferer's assessment of the cause and effects of the pain process.

PERSISTENCE OF PAIN

The changes in personality wrought by the persistence of pain are rooted in well-known anatomical connections between the deep-seated pain perception centers in the thalamus of the brain (see Chapter 8) and the frontal lobes of the cerebral hemispheres. The frontal lobes, in general, serve human conscious effort in directing day-to-day activities and planning short- and long-term events. The nerve centers (or association areas) of the frontal lobes must receive information from the environment surrounding the body. The sensory nervous system provides this information. Association fiber bundles then relay the information to areas of the brain where data from previous experiences are stored. Under or-

dinary circumstances, the process continues until a goal or set of goals is determined. Then the brain motor systems are engaged to carry out the planned process.

When new, incoming sensory data are painful, however, either because the peripheral stimulus is noxious or because the sensory element is unpleasant as compared with prior experiences, the frontal lobe system becomes dominated by the incoming stimulus or stimuli, and the individual's attention is continuously diverted toward the painful sensation.

A painful stimulus, then, interferes with the usual conscious thought processes. From a teleological standpoint, such a system makes good sense. In order to survive, a being's best defensive organs must come into play when there is a serious threat to life or limb. The pain perception warning system is the alarm that protects the body as a whole, or in significant part, from destruction. The volume of pain information reaching the cerebrum is directly related to the potential threat of the source of the stimulus to the body or body part. The frontal lobes, which are intricately developed in the human nervous system, are intimately associated with conscious thought processes. They are the most potent defense mechanisms in the animal kingdom. If a person's body is seriously threatened by some source that produces an injury to tissues, the cerebral frontal lobes receive a significant warning signal in order to trigger a conscious effort to thwart the danger. The projection of this warning signal onto the frontal cerebral regions has to be strong enough to divert conscious effort, so that the body can be defended against the threat producing the pain. Thus, a brain asleep is aroused, and a brain engaged in activity less intense than striving for survival is immediately diverted to the source of the painful stimulus.

Clinical experience with pain verifies this concept. The focus of consciousness is diverted in ever-increasing degrees toward the source of pain as the intensity of the stimulus increases. Other, non-noxious sensory information, such as position sense, touch and pressure sense, are ignored as the brain concentrates on the source of the pain and, ultimately, on mechanisms to avoid the danger. For example, a bee sting can divert an automobile driver's attention to the point where he will turn his conscious

effort toward the source of the pain, at the expense of decreasing his concentration on maintaining the vehicle on the road, which could lead to loss of control of the car and perhaps a serious accident.

This projection of pain information onto the frontal lobes is a primitive defense mechanism that demands priority unless the individual makes a concerted effort to direct his concentration to something other than the pain. The driver could force himself to bring the car to a safe stop before attending to the bee sting. The effort required in that case would not be so great. However, if the degree of pain were five or ten times greater, diverting attention away from the stimulus would be a laborious, perhaps nearly impossible, task.

If a painful stimulus persists, to divert one's attention away from the pain requires a consistent conscious effort and a good deal of the brain's energy. When the distress is mild enough, energy is easily replenished, and consciousness is easily directed as the will desires. However, when the painful stimulus is of high intensity, the energy demands are great, fatigue sets in, and the conscious attention is drawn more and more to the painful problem.

This is obviously an oversimplification of brain mechanisms. Conscious attention to pain can be, and often is altered by a number of other factors which are in part or in whole consciously determined. For instance, both fear and the mental determination to carry out a certain mission can repress the dominating effect of a highly painful stimulus on the frontal cerebral mechanism. Stories of wartime casualties demonstrate that mental or emotional states can negate the painful effects of a serious wound. In other circumstances, the pain from such a wound might overwhelm the victim. Where great determination or fear existed, the wounded man was either unaware or only peripherally aware of the pain until his act of courage or of escape was accomplished. Deep-sea divers, escaping a shark attack, often do not perceive the terrible pain of a sheared limb until they are safely out of the animal's reach.

When an acute pain becomes chronic, for whatever organic reason, the persistent bombardment of the frontal lobes ceaselessly diverts conscious focus and reduces attention span in other areas.

If the cause of a persistent noxious stimulus cannot be removed, or the pain cannot be eliminated by interruption of sensory nerve pathways, then the victim's consciousness is relentlessly directed toward the painful sensation. When this occurs, the sufferer must either develop the ability to concentrate attention consistently away from the pain, that is, ignore it, or reduce the pain through the use of narcotics or tranquilizers. Although the use of narcotics may seem the easiest solution to the patient, he soon recognizes that drug dependence to counteract pain blunts conscious activity for any purpose and reduces other cerebral function as well. At this point, the intricate psychological factors that make up the sufferer's personality play a significant role in the choice of the best solution to the problem. Persons who have developed a great deal of independence and whose daily tasks are so important to them that their greatest desire is to continue performing those tasks, will carry on in spite of persistent pain. Some rare, highly motivated persons even develop the capability to redirect conscious effort away from the constant sensory signals so that they become truly unaware of pain much of the time. When fatigue diminishes the power of concentration, the pressure of the pain forces it back into the center of attention. Such persons may continue to lead productive lives in the face of high levels of chronic pain, but they require some drugs to treat mood changes as well as occasional narcotics for the pain itself. These patients ordinarily benefit from carefully selected therapy, aimed at the source of the pain where possible or at interrupting sensorineural paths to reduce the volume of incoming painful stimuli reaching cerebral centers.

As the spectrum of human personality varies, so does the response to a painful stimulus. Less independent individuals may desire to be taken care of by those around them. The customs of society, however, may dictate that such individuals be supporters, not the supported. Family breadwinners or maternal or paternal heads of families, constantly subjected to the stresses of growing children, are primary examples of socially determined supporters. If such individuals wish relief from their roles as leaders and judges, a chronic pain problem or potential problem can satisfy their secret desire for dependence, without the embarrassment of an open admission. A mild symptom is magnified, or