

SquareONE Rehabilitation

PAIN MANAGEMENT

THROUGH SELF-MANAGEMENT

OF

EMOTIONS AND STRESS

PAIN MANAGEMENT THROUGH SELF-MANAGEMENT OF EMOTIONS AND STRESS

Overview of The Manual

The purpose of this manual is to provide you with an understanding of how certain psychological factors, especially normal everyday stress, can interact with your physical condition to increase the intensity, frequency, and duration of the pain you experience. We will discuss what stress is, how you can become more aware of it, and what you can do to prevent it from causing you more pain. We will learn about the Mind-Body connection, deep diaphragmatic breathing, and the relaxation response and **practice** relaxation. We will learn about the effects pain has on your relationships and communication. We will develop a Relapse Prevention plan and learn about to maintain the gains you make in managing your pain. You will also read about typical results previous clients have experienced from the Pain Management Therapy.

I. Purpose of Pain Management Therapy

The two main purposes are: 1) to help you learn how to better tolerate or reduce your pain; and 2) to improve your ability to function and thus the quality of your life in areas upon which your pain has had a negative impact.

However, before any progress can be made, two points must be made. First, you have not been referred to Pain Management Therapy because anyone thinks your pain problems are in "your head" or that it is **just** psychological in nature. Second, we assume that the pain you experience is real. However, factors such as stress and mood can worsen your pain and increase your suffering. Chronic pain is neither physical nor psychological, but is an interaction between the two. For example, research has shown that when stressed, people who have chronic pain will respond with increased muscle activity in the painful region and thereby cause more "wear and tear" on the joint, which is already weak to some degree. Moods often have the same effect and, for reasons that will be explained later, can make your pain seem a lot worse than it has to be. Even if you don't feel you have more stress in your life than the normal individual, you must become more expert at handling the everyday stress to which all of us are subjected. Furthermore, simply being in pain is a type of stress that, if not controlled, can lead to a vicious cycle of increased pain.

Therefore, Pain Management Therapy is designed to teach you stress and mood management skills that will reduce your pain as much as possible. It will also help you gain control of factors that might otherwise sabotage you and your physician's efforts to use medical approaches to treat your pain problem.

This therapy may very well differ from the kinds of treatments you have had in the past and may not be the kind you are expecting at this time. Many clients have the expectation that something will be "done" to them and that all they have to do is show up and everything will be "fixed" by the doctor. However, it is important to note that Pain Management Therapy has a very different orientation. You will be taught many skills, the success of which will depend on how much time and effort you are willing to invest.

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At this point, you might want to ask yourself the following questions:

1. Is it important for me to learn to manage my pain?
2. Am I willing to invest the time and energy?
3. Am I willing to make lifestyle changes to improve the quality of my life?

The responsibility and choice are yours. If you want to continue feeling exactly the way you do now, don't change anything. However, if you want to feel different, you will need to think and act in a different way.

In summary, Pain Management Therapy is designed to teach you specific skills which research has shown to be helpful in managing chronic pain as well as a variety of other problems. The purpose of this therapy will be to provide you with a general overview of what to expect over the next 4 weeks, as well as to get you started on the first steps of in Pain Management.

II. Overview of Pain Management Therapy

What is Pain Management Therapy?

Pain Management Therapy is structured to teach clients how to manage pain more effectively. Pain Management Therapy is more than just therapy. It is a therapy where you will learn specific stress management and pain reduction techniques that have been found to be effective with many pain problems.

Chronic pain problems caused by injury are extremely complex, with many possible factors involved, some of which may be psychological in nature. Often the difficulties associated with the pain disorder are not a question of being either physical or psychological, but rather are an interaction between the two.

For example, injured people have certain structural/physiological abnormalities. Under stress, which we all experience to varying degrees, the muscles in the body become overactive, thereby aggravating the injured area and causing the person to experience more pain. Injured people may have no more stress in their lives than the majority of individuals, but since they have structural/physical abnormalities, they have to become more skillful at handling the muscle contraction process.

Most people are not entirely aware of stress or how it affects their body. Without an awareness of the skills to reduce stress, this can not only aggravate the condition, resulting in increased pain, but it can also mean that you may "tear down" what you have been trying to "build up" and thwart your treatment progress.

Therefore, the procedures you are about to learn may increase the likelihood that other therapies (Physio, Chiropractic etc.) will have a more potent impact on reducing pain and discomfort.

Other roles that psychological factors play in chronic pain are made clear by reviewing what we know about pain.

CHAPTER 1

A. Specificity Model of Pain

Prior to the 1950's, the major medical notion was that the amount of pain a person experienced was related to the amount of tissue damage (e.g., the bigger the cut, the more the hurt). However, some pain researchers during WWII began making some observations that didn't seem to fit this model. They observed some soldiers on the front line who, despite serious wounds, did not seem to be bothered by pain, and often did not require morphine when it would have seemed to be necessary. They then collected data with these soldiers regarding the amount of tissue damage, the intensity of pain reported, and medications required. They compared these results with similar data collected in a civilian population in the United States. What they found was that for a given level of tissue damage, there were often large differences in the amount of pain reported by the two populations (e.g., the soldiers reported less pain and required less medications than their civilian counterparts with comparable tissue damage).

This state of affairs puzzled the early researchers, so they began interviewing the soldiers to determine what the pain meant to them. The soldiers reported that their wounds meant a ticket home, away from the war zone, back to safety where they could be reunited with "loved ones". In contrast, their civilian counterparts interpreted their wounds in a different context. To them, it meant being in a hospital which was often scary, and away from "loved ones", loss of time from work, and depletion of funds.

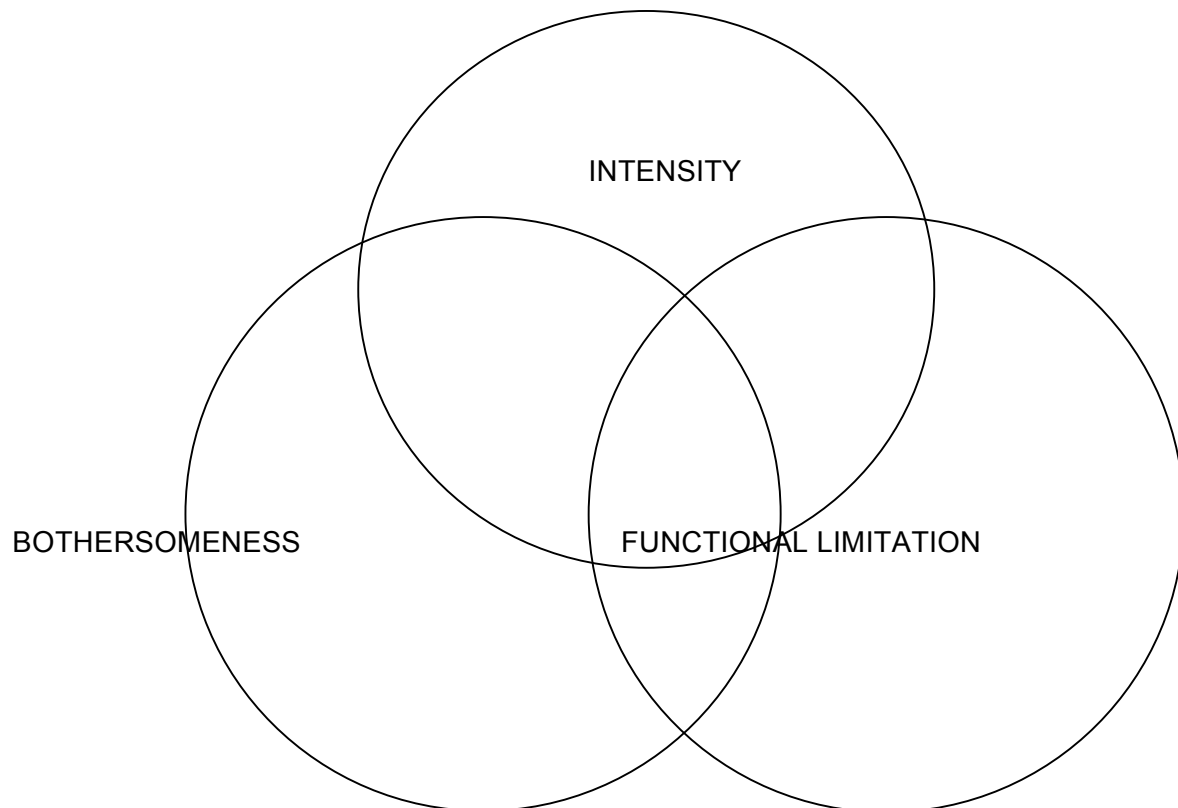
As a result of these observations, the researchers concluded that the experience of pain was more than merely physical sensation, but that the interpretation or meaning of pain influenced the actual perception of pain. Since that time, several decades of research have shown that in addition to the intensity of pain the psychological variables of attention, mood (e.g. anxiety, depression), influence how we evaluate our pain along with the functional limitations we experience which all greatly influence our perception of pain or how "bothersome" it is.

Looking at pain in this way, it becomes obvious that any of these three dimensions of intensity, bothersomeness and functional limitation can vary independently of the others. A very mild pain can be very bothersome if it prevents you from engaging in an important or pleasurable activity. A more intense pain may not limit as much if you are involved in doing something extremely important e.g., rescuing your child from a dangerous situation. A pain that is intense but lets you avoid dinner with unpleasant company may not be as bothersome.

See diagram 1

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Diagram 1.
PAIN COMPONENTS



Pain is not a one-dimensional phenomenon. There are at least three dimensions to pain:

INTENSITY: How strong or intense is the sensation. Descriptors are quantitative, such as mild, moderate, intense, very intense, etc.

BOTHERSOMENESS: How annoying or interfering is the sensation? Examples include annoying, irritating, nagging, tiring, draining, depressing, and frustrating.

FUNCTIONAL LIMITATION: How much the pain prevents you from doing things. For example, it may prevent you from lifting things, affect your ability to read or concentrate, lower tolerance for exercise, etc.

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B. Gate Control Theory of Pain

Please refer to Diagrams 2 and 3 to aid you in understanding how psychological variables may affect physical processes that can increase or decrease the perception of pain even when the amount of pain information sent from the injured area (or other areas) is held constant.

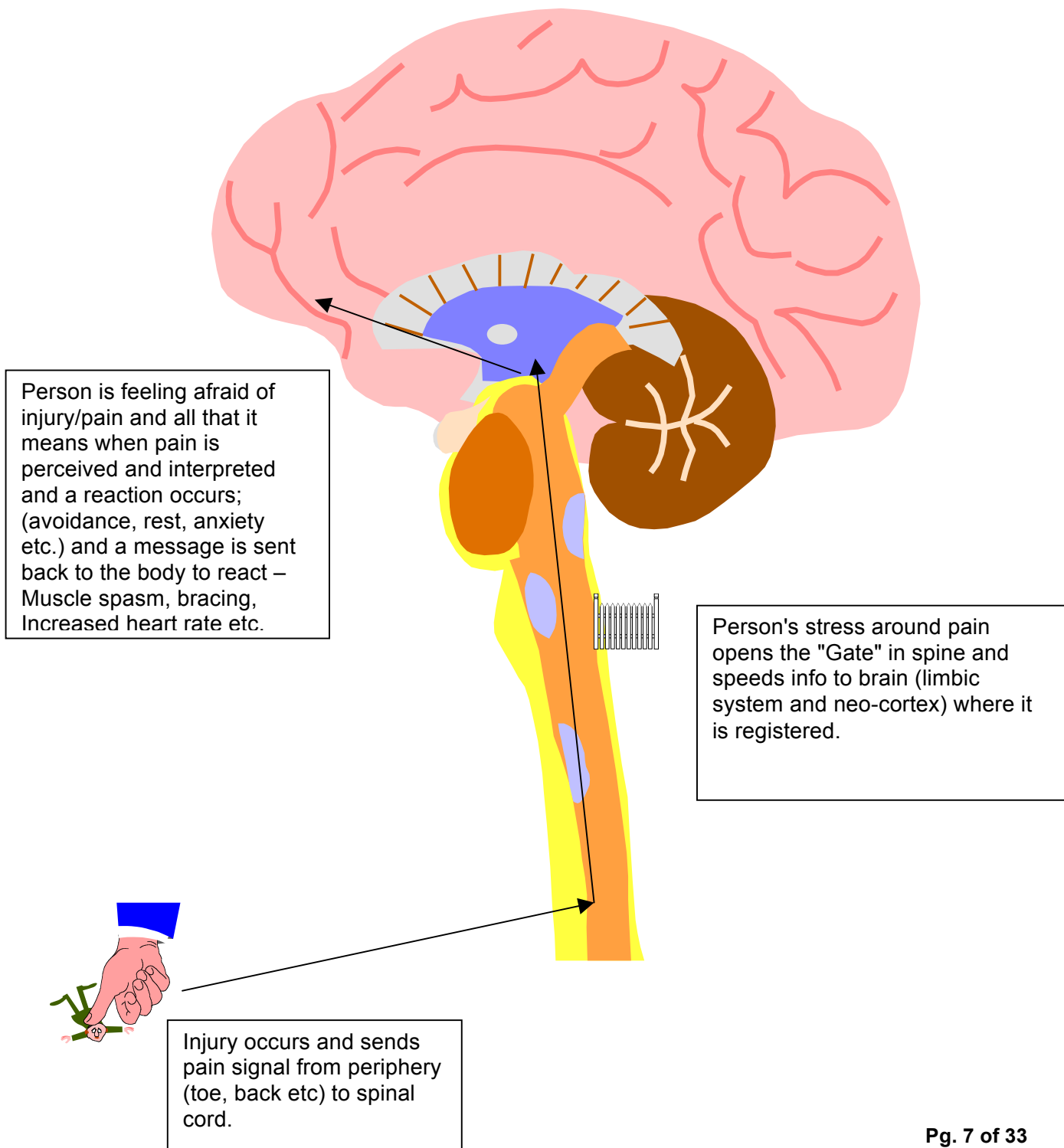
Let's look at Diagram 2 first, which illustrates how pain bothersomeness can be increased by the psychological factors of anxiety or depression. Pain information traveling from your sore area passes through the spinal cord prior to being sent to and processed by the brain. This information is processed at the level of the spinal cord first. The Gate Control Theory proposes that there are thousands of gating mechanisms that modulate the amount of information allowed to pass on to the brain. In Diagram 2, where the person is in a depressed or anxious state, descending impulses from the brain to the spinal cord serve to "open the gate" such that pain impulses arriving from sore areas are allowed to pass on to the brain unmodulated. This results in a perception of heightened pain intensity.

Diagram 3 depicts this hypothetical person being in an alert, relaxed, good mood. Here the brain sends descending information to the spinal cord, which closes the gate and dampens the amount of information allowed to pass on to the brain. This results in a perception of lowered pain intensity. Note that the amount of pain information from the sore area is the same in both situations. The psychological state of the person influences how much of this information is sent to the brain and in this way determines the relative intensity of pain experienced.

A common example, which illustrates this Gate Control Theory in action, is the case of a football player who gets a cut on his leg during the game. However, because of the distraction of the excitement, he doesn't notice it until he gets to the locker room when he sees blood trickling down his leg. At this point and not before, he gets upset by the sight of blood and then quickly begins to notice pain.

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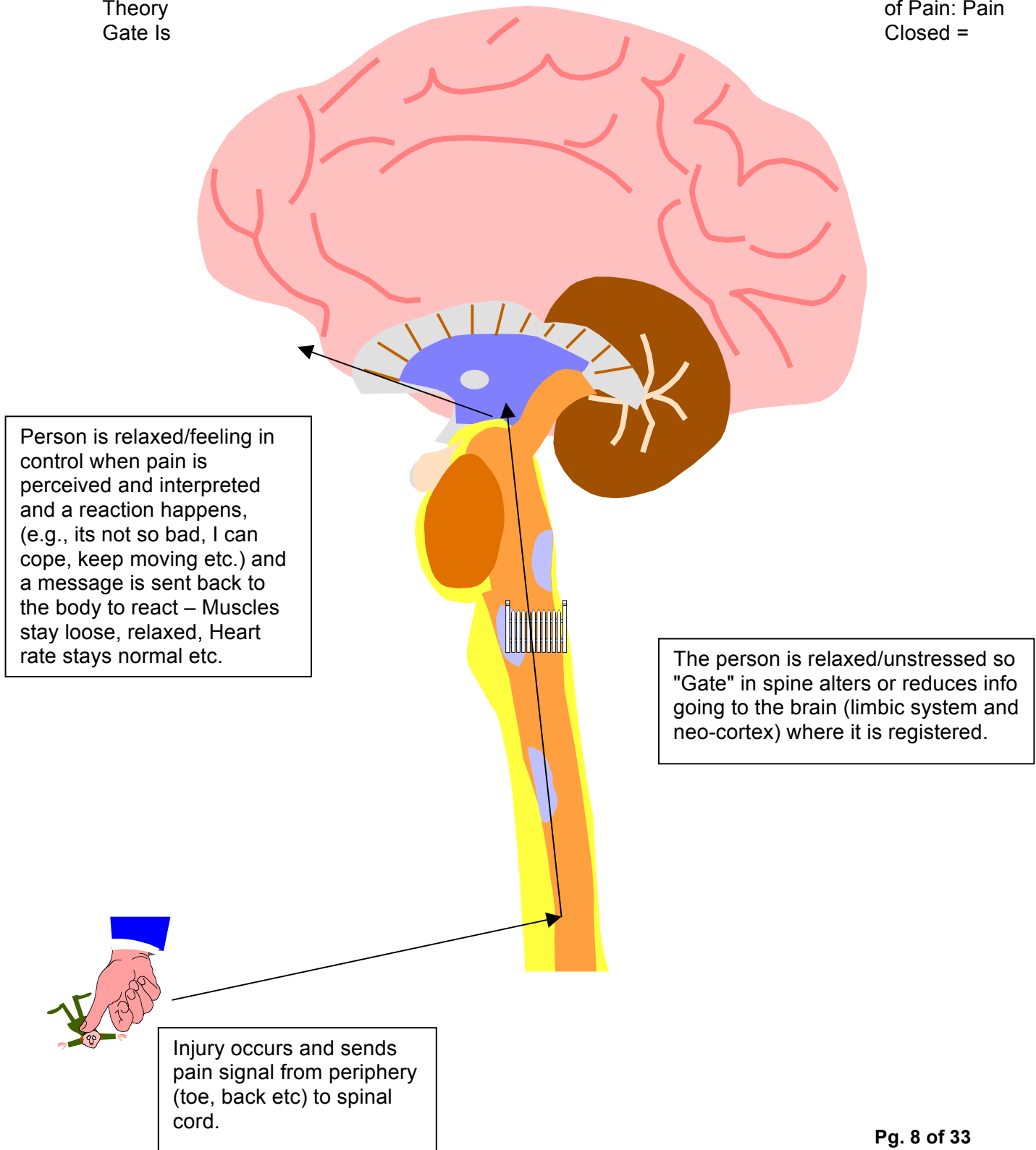
Diagram 2
Gate Control Theory of Pain: Pain Gate Is Open = INCREASED PAIN



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Gate
Theory
Gate Is

Diagram 3.
Control
of Pain: Pain
Closed =



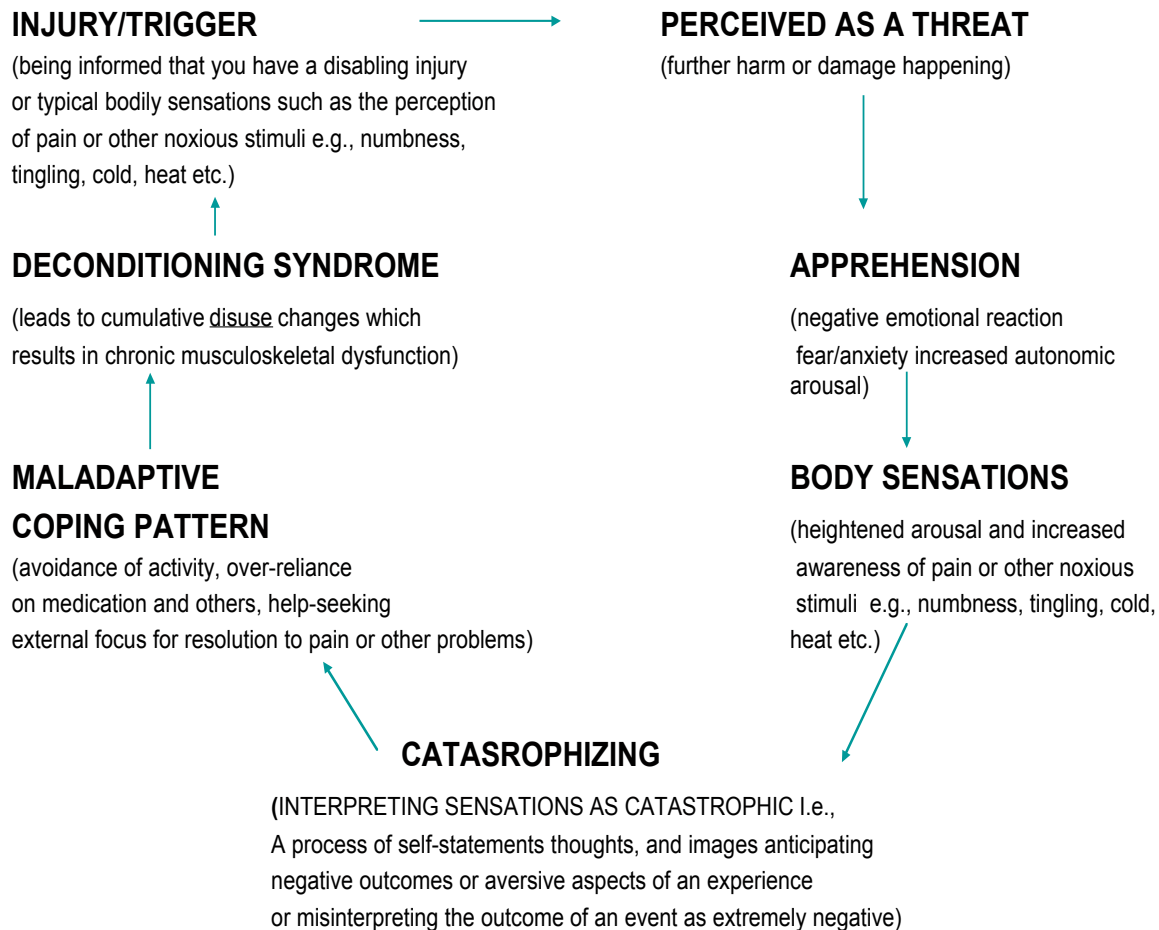
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C. Fear-Pain Cycle

Another way in which emotions can interact with the Gate Control Theory to increase pain is illustrated by what may happen with your initial responses to the first signs of a backache or other pain. Pain is cyclical in nature (sometimes you have pain, sometimes you don't). When you first start noticing pain, you may have an alarm reaction like "Oh no, here we go again", or "How am I ever going to get all this work done if I get a backache?" Also, you may have an image of what your last backache was like and get scared at the thought of a "repeat performance". Unfortunately, these alarm reactions at the beginning of your pain cycle may serve to make them worse and/or maintain the amount of pain you experience. What can happen is that you trigger a "pain-fear" cycle where your body tenses as part of the alarm reaction in response to your thoughts or images. This then produces mechanical aggravation as a result of increased muscle activity over "sore places" and the gates in your spinal cord open, both of which serve to increase pain. This may then make you more upset, leading to more pain, etc. At this point, you can be caught in a vicious upward spiraling cycle of pain (see Diagram 3).

DIAGRAM 3

FEAR PAIN CYCLE



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This diagram shows how the response of anxiety to the first perception of pain can serve to escalate the intensity of pain experienced. This occurs as a result of psychophysiological reactions where: a) muscle activity increases in response to anxiety, which produces a mechanical aggravation of an already sore area, and b) the gating mechanisms in the spinal cord opens and lets pain information travel unmodulated to the brain.

One of the major goals of the Pain Management Therapy will be to teach you skills that will enable you to produce a rapid relaxation response. This is the ability to produce a feeling of relaxation that reduces excessive muscle activity and the resulting worsening of pain symptoms.

V. Stress: What It Is, How to Detect It, And What to Do About It

We've been talking about how this "culprit" stress can make pain worse. But what is stress? Stress is a common household word in American society. However, stress means a lot of different things to different people. Stress is usually thought of in the negative sense in terms of events like injury, illness or death of someone dear to us, divorce, work deadlines and other time pressures, traffic, financial concerns, unemployment, child rearing, etc. However, stress can be caused by seemingly "neutral" events leading to boredom.

Since stress means so many different things, how could you possibly avoid the negative consequences when it is so hard to recognize because of these different guises? To answer that, let's start with a definition of stress that is common to all stressful situations no matter how different they may seem. Stress is the perception that the demands upon you are greater than you can competently meet. In situations where you have this perception, learn to scan your body for the following symptoms that indicate you are stressed:

1. Tight muscles, particularly in the neck and shoulders.
2. Increased heart rate.
3. Sweating.
4. Dry mouth.
5. Irritable stomach.
6. Cool, moist hands.

These symptoms are all indicative of stress. Also, here are some subjective symptoms to watch for which are also indicative of stress:

1. Irritability.
2. Nervousness.
3. Jumpiness

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4. Sense of time pressure or urgency.

Usually, we do not pay attention to what our bodies are doing because we are so involved in pursuing our goals. But how many of us feel tight muscles in the back or neck at the end of a hard day? Furthermore, we all have different frames of reference in terms of what we mean by stress or relaxation. What you call relaxed, I may experience as stress and vice versa. People often begin the therapy by saying, "I don't have stress", until they learn what it's like to be profoundly relaxed. This often changes the person's frame of reference so that they are better able to discriminate between different kinds of stress in the future. What can you do about these things? Well, that's what this therapy and book is all about!

How Much Pain Relief Can You Expect From the Pain Management Therapy?

Unfortunately, there are no guarantees. However, let's look at some typical outcomes experienced by previous members of the Pain Management Therapy. The results of client's experiences are quite variable. A small percentage (0-10%) experience total pain relief, another small percentage does not report any reduction in pain. The sizable majority falls somewhere in between. These people are able to achieve better control of pain by decreasing the overall intensity, frequency, and duration of pain, even though it is still there at times.

Although a small minority of people achieve no pain relief, if people do their homework assignments and work hard to master the skills taught in the Pain Management Therapy, virtually everyone reports that what was learned was extremely valuable in terms of increasing the quality of life by reducing stress and increasing happiness and a feeling of well-being.

It is important to emphasize that this therapy is different from other medical procedures that you have experienced. You are probably used to doctors performing procedures while you remain in a largely passive role. However, in this therapy you will have to assume an active role. As professionals, we will be assuming the role of teachers or consultants where we will teach you to acquire skills to enable you to manage pain more effectively. This means that what you get out of therapy is proportional to what you put in. Furthermore, in order for the types of skills you will learn to be effective, they will involve lifestyle changes. In other words, you can't learn skills and at the end of therapy stop doing them and expect to enjoy continued benefits. This is not like surgery that produces lasting change requiring no further maintenance. In fact, maintenance of changes you make during the therapy will be as important as the skills you learn to make the initial changes. Fortunately, most people find the changes they make to be pleasurable and therefore positively reinforcing, which helps to keep things going.

Homework:

The assignment for this next week will be to self-monitor pain and stress levels four times per day. You will do this in the morning upon awakening, at lunch, at dinner, and at bedtime. There are four important reasons for doing this assessment.

To learn connections (if any) between stress and pain.

To increase your awareness of stress. "Tuning in" four times a day is one way of forcing yourself to be more aware of how your body is responding to stress.

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To learn other factors which increase or decrease pain. By keeping track of pain and stress levels at four different time periods during the day (try to make your ratings the same time each day if at all possible), you can learn how your pain varies during the day and across the week. If you keep track of activities around these time periods, you may also learn that certain things reliably increase or decrease your pain levels.

Finally, by recording your pain/stress levels in this manner, we can evaluate the impact the Pain Management Therapy has on you at the end of treatment. This will serve as our "benchmark" of comparison. Hopefully, we will see reductions in stress and pain after you learn the pain manage skills we'll be teaching you.

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CHAPTER 2

Being aware of the relationship between your feelings and pain is the first step to learning how to manage your pain (and your feelings of stress and anxiety). In the next sections, we will discuss the first of three series of techniques you will learn to manage your pain.

The three techniques are:

1. Progressive Muscle Relaxation.
 2. Deep Diaphragmatic Breathing
 3. Challenging Your Thoughts.
- I. Progressive Muscle Relaxation (PMR)

Progressive Muscle Relaxation is the first of a series of techniques you will learn to help reduce feelings of stress and anxiety.

Learning proper relaxation will actually help increase your awareness of stress and anxiety by giving you a broader frame of reference (e.g. if you are always stressed, you may not realize how stressed you feel because you don't know what it's like to be relaxed).

What is Progressive Muscle Relaxation?

Progressive Muscle Relaxation consists of a series of muscular exercises that involve tensing, then relaxing, each of 16 separate muscle groups throughout the body. This procedure is designed to decrease muscle activity (e.g. muscle tension) and, as a result, produce a feeling of profound relaxation throughout the body. This procedure will be extremely important for those of you who have backaches, headaches, and facial and/or neck pain. To help you to understand the relationship between stress and your pain, and the utility of complete body relaxation as a means to manage your pain, we will briefly review the important points of the psychophysiological model of pain that we discussed during the last session and in the previous chapter. Increased stress often increases muscle activity, which produces a mechanical aggravation at the painful area. The addition of chronic muscle tension in the neck, shoulders, or back may disturb the blood flow. Add to this state increased muscle activity, general body tension, and pain anxiety, and then you have a situation where pain information is intensified (e.g. Gate Control Theory). All of these factors suggest that learning how to relax muscles specifically, and your body generally, is an important skill for pain management.

The Technique:

First, you will be instructed to focus your attention on the muscles in your right hand and lower arm by making a tight fist and tensing the muscles in the area. The instructions will tell you when to begin tensing by stating the word "Now". As soon as you hear the instructions, you may be tempted to start tensing; however, refrain from doing so until you hear the work "Now"

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because you want to hold the tension for the optimal 5-7 seconds. If you tense from the beginning of the instructions, you will tense the muscles too long and risk painful muscle spasms. You will hold the tension for 5-7 seconds and be instructed to notice how it feels, then told to relax. When you are told to relax, throw all tension out quickly at once to increase the momentum toward relaxation. You will be in the relaxed state for approximately 20 seconds and be instructed to notice what it feels like. The instructions proceed to the next muscle group using the same procedure throughout the body. The 16 muscle groups are the following (in order): hand and arm (left and right), biceps (left and right), forehead, middle face, lower face, neck, shoulders, abdomen, thighs (left and right), calves (left and right), and feet (left and right). You do not have to remember the specific strategy because you will be given a tape that will give you these instructions. The importance of this exercise is not only to promote relaxation, but also to learn to discriminate between feelings of tension and relaxation.

II. Deep Diaphragmatic Breathing

Breathing is an activity that we take for granted. We are often unaware of the process because it is something we do automatically. We do know that breathing is essential for living. It is also a powerful tool that, when used properly, can reduce stress.

In this section, we will first briefly describe the process of breathing and how it relates to stress and anxiety. Second, we will describe an exercise that will increase your attention to your breathing. Third, we will discuss the easiest method of relaxation, deep stomach diaphragmatic breathing.

A. Breathing and its Relationship to Stress and Anxiety

When you breathe, you inhale air through your nose that is warmed by the mucus in your nasal passages and purified by the hairs in your nose. The air travels to your lungs to give oxygen to your blood in your heart that is then pumped to your body. The organs in your body use the oxygen to function and exchange waste products back to the blood, which returns to the heart to then, rejuvenate itself with more oxygen. The carbon dioxide released with every exhalation is a result of the waste products. This automatic process is dependent upon a sheet-like muscle located beneath your lungs known as the diaphragm. When you inhale, your diaphragm pushes down, allowing your lungs to drop and suck in air. Exhalation involves the diaphragm moving upward, allowing your lungs to contract. What most people do not know is that the diaphragm, when used improperly, can hamper your breathing and consequently the functioning of your organs. For instance, if your blood is not oxygenated or purified, your organs will not receive enough oxygen that may lead to stomach upset or weakness, and then to feelings of depression and anxiety. In addition, hyperventilation (breathing too quickly or forcefully, as in panic situations) creates a blood gas imbalance that can lead to unpleasant feelings such as dizziness or tingling. So, it is important to pay attention to your breathing style. One way to do this is to do the following simple exercise:

B. Breathing Awareness Exercise

Put one hand on your chest and one on your stomach. Breathe normally. Notice how your stomach moves in relation to your chest. Now, inhale deeply and exhale slowly. You will notice

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how much more dramatic the relationship is between your stomach and chest movements. This is the type of breathing you do just before you fall asleep. Becoming aware of your breathing is the first step of Deep Stomach/Diaphragmatic Breathing.

C. What is Deep Stomach Diaphragmatic Breathing?

Perhaps the easiest and most "portable" method of relaxation is deep diaphragmatic breathing. This is a major component of the Lamaze technique, which is well known as a procedure that helps manage pain during birth. As the term suggests, this procedure involves breathing with the diaphragm. It is an unforced type of breathing that allows your lungs to become filled until you notice pressure and cannot contain any more air. At this point, you let the air out slowly and smoothly until the next inhalation comes automatically.

It's often helpful to do this exercise lying on your back as this enables you more easily to isolate the diaphragm. Practice it a minimum of 4 times daily for approximately 5 minutes or more each session. It is important to realize that if you don't plan specific times to practice, you will be likely to forget. Some natural prompts in your everyday life are useful (e.g. just before breakfast, lunch, dinner, bedtime, at traffic lights, when you first start up the car, etc.).

MAINTENANCE OF THE RELAXATION RESPONSE:

The relaxation response is a skill like any other skill. If you don't use it, you lose it!

Practicing the "long-hand" procedure (e.g. one of the tapes) two to three times a week is the minimum for maintaining the relaxation response. Daily practice of the Rapid Relaxation Response is ideal.

Putting up signs or colored dots in areas where you are likely to see them are helpful prompts to practice the Rapid Relaxation Response (a small piece of colored tape on your wristwatch, telephone, or rear view mirror are some examples). A postcard of a relaxing vacation (imagined or real) in your workspace can serve as both a prompt as well as an aid for imagery in your rapid relaxation response.

CHAPTER 3

WHAT WE THINK INFLUENCES WHAT WE FEEL

This section of reading will teach you how thoughts influence what we feel, what we do, and how our bodies physically respond. Our experience of being human can be thought of as consisting of several basic components (see Diagram 7). Diagram 7 shows how thoughts, feelings, behavior, and physiology all serve to mutually influence each other in the overall context of environment. Thoughts are a particularly important part of stress because even if you are skilled at reducing arousal once it occurs, if the thought or belief that was causing it remains, stress levels will quickly escalate again. If relaxation-training skills were relied upon alone, this would mean an endless "tug of war" struggle that could prove quite frustrating. In many cases, it is more desirable to "nip anxiety in the bud" by dealing with the thoughts, beliefs, or assumptions that underlie uncomfortable feelings and physiological reactions.

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We should clarify that our goal is not to make you live your life without emotions like robots. Rather, the goal is to help you live life more comfortably without wasting energy on emotions that may be based on distorted or inaccurate thinking. The first step is to become more aware of how your thoughts are connected with your feelings. To do this, over the next week keep track of what thoughts or images are in your mind at the time of a particularly strong emotion.

In those instances when you can readily see how your upsetting thoughts are inaccurate and you are able to make them more accurate, you will often notice an improvement in feeling. The goal of this week's assignment is simply to provide you with the experience of seeing how your thoughts are connected with your feelings and to begin to uncover some of the beliefs or assumptions that empower them.

Cognitive Therapy for Chronic Pain: Working Through Some Common Cognitive Inaccuracies:

Some pain-related inaccurate thoughts and accompanying emotions common with chronic pain clients are listed below. Try to identify the cognitive inaccuracy and determine what a more accurate thought would be. When you've worked through these thoughts, examine the following pages to see some examples of how they could be handled with cognitive therapy.

Emotion: ANXIETY

Thought: I can feel the beginning of a backache now and I know it's going to develop into an incapacitating one.

Cognitive Inaccuracy: Over-generalization and Jumping to Conclusions (Catastrophizing).

More Accurate Thought: Actually, I don't know for sure it will get that bad. I can think of other times that it has not happened. Furthermore, that catastrophic thought is upsetting and that emotional upset may cause physical reactions that actually cause the headache to get worse. This would be a good time to practice the relaxation response.

Emotion: DEPRESSION

Thought: I hurt now in spite of doing pain management exercises, so what's the point of doing them at all?

Cognitive Inaccuracy: All-or-Nothing Thinking and Negative Filtering.

More Accurate Thought: It doesn't really make sense to discard procedures that help some of the time just because sometimes they don't (all-or-nothing thinking). That is like "throwing out the baby with the bath water". When I hurt, it's easy to remember only the times the pain management techniques don't work and to forget about the times they do (negative filtering).

Emotion: DEPRESSION

Thought: If I go out now, my pain will get worse so I better stay home and rest.

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Cognitive Inaccuracy: Jumping to Conclusions (two cases).

More Accurate Thought: What evidence do I have that: 1) my pain will get worse if I go out? Or 2) that it will be better if I stay home? Is there a chance that the pain will be no worse from going out and that I might enjoy the added benefit of doing something more productive and enjoyable than hibernating? I could certainly test this out.

Emotion: ANGER

Thought: It's not fair that I have to do all these time-consuming exercises to manage my pain. (What is upsetting about that?) I shouldn't have to go through all this.

Cognitive Inaccuracy: Should Statement (this was a hard one).

More Accurate Thought: Saying "It's not fair" in this case is like saying "I shouldn't hurt". Both statements imply that there is some universal law stating who should hurt, who shouldn't, and why. This inaccurate thought places responsibility on the "maker" of these unknown rules. Since sometimes, bad things happen to good people, and since we don't know the "master plan", it seems the most important conclusion is simply that I do hurt and I have to deal with it the best way I can.

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Emotion: DEPRESSION

Thought: I can't do all the things I used to be able to because of pain (or, I can't be as productive as I could without pain). (What does that mean to me?) I'm useless (Hot Thought).

Cognitive Inaccuracy: Negative filtering and all-or-nothing thinking.

More Accurate Thought: I seem to be focusing on the things I can't do and selectively filtering out the things I still can do. Besides, what exactly are the things I can't do? Is that really true or could I still do them, albeit at a different level? It would be better (as always) to accept my true limitations and refocus my attention on developing new horizons that are in the realm of my capabilities.

Emotion: DEPRESSION/ANXIETY

Thought: This headache will keep me from enjoying myself socially so I might as well stay home.

Cognitive Inaccuracy: Jumping to conclusions.

More Accurate Thought: How do I know it will keep me from enjoying myself? Can't I think of times I enjoyed myself in spite of pain? Besides, if I'm going to hurt at home, wouldn't it be better to hurt while socializing? At least then I might be able to glean something worthwhile in spite of pain.

Emotion: DEPRESSION

Thought: If I can't attain the same level of excellence at work that I did before I had pain, I don't want to go back at all.

Cognitive Inaccuracy: All-or-nothing thinking; filtering.

More Accurate Thought: Although it will certainly be frustrating not to be able to perform as well as before, it doesn't make sense to disqualify all the things I still can do despite the pain. Besides, I'm not really sure what my true limitations are as yet.

Emotion: ANGER/ANXIETY/DEPRESSION

Thought: My problem is mostly physical, not psychological, and I'm not going to stop looking until I find the cure.

Cognitive Inaccuracy: All-or-nothing. (This statement does not take into account the fact that there are both physical and psychological factors that interact with each other. Also, a complete "cure" is demanded versus managing pain better, albeit imperfectly.)

More Accurate Thought: My pain has improved, although it is still there at times. I guess I would be "throwing out the baby with the bath water" if I stopped doing all of my pain management

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skills. In terms of searching until I find a cure, I guess I have to examine the available evidence as to how fruitful this attitude has been to date. I certainly have seen a lot of highly recommended professionals for this and no "total cure" has been forthcoming. Perhaps I need to accept responsibility for dealing with this the best way I can.

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Emotion: **ANGER**

Thought: I can feel the start of a headache, but I don't have the time to do my relaxation exercises. I want something that will just take care of it without interfering with what I need to do.

Cognitive Inaccuracy: This is a hard one! It is actually the reverse of personalization. We could call it Depersonalization. Basically, you do not want to accept responsibility for taking care of yourself.

More Accurate Thought: What does it mean that I am not making my pain management skills a priority? I spend so much time and energy pursuing other goals and activities, but can't take the time to improve the quality of my life? Furthermore, I know by now there are no easy ways or I surely would have discovered them.

CHAPTER 4

COMMUNICATION SKILLS

Learning good communication is like any of the other skills you have learned in your life, e.g. riding a bike, driving a car. It is important for you to realize that you will begin learning good communication in this course, but like driving a car, after most of us get a driver's license we are not really good drivers. It usually takes several thousand miles of good driving under a variety of road conditions to practice the driving skills we learned before we are really competent drivers. It is impossible to learn all the necessary skills at one time. At first you may learn how to drive in a parking lot, then on crowded streets, and finally in traffic.

Similarly, communication skills you first learn will not solve all your problems. However, each skill will build upon those skills you've already learned. Also, like the other skills, you are learning in this therapy, the essential ingredient is Practice, Practice, and Practice. So we only ask that you try to practice the skills throughout the program. At the beginning, you will still find yourself experiencing problems in your relationships that you seem unable to handle. The reason is that there are additional skills you've not yet learned that will eventually help you to get through these problem points.

The first pitfall you will encounter in doing the things we recommend is that it may seem unspontaneous and phony. We have found that some people experience this when first learning a new skill and you may have noticed this in doing your body mechanics and different various physical exercises. At first, it felt very uncomfortable and unfamiliar, but gradually you realized it felt good and, in fact, you will need to tailor the new ways of acting so that they fit your personality and your individual style. It's like buying a new pair of shoes that are cut in standard sizes. They're not really comfortable until you break them in. Then they fit the shape of your foot. The same is true for the new skills of stress management, and communication.

How much you profit from this program will be partly determined by the extent to which you practice and put into effect the various suggestions. We recommend that you adopt a new approach to this program. Be experimental. Try a suggestion first before you evaluate. Let

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experience be your teacher. Many of the things we suggest provide a great deal of relief from distress. However, some of them are good for some people, but not for others. TRY IT FIRST, THEN EVALUATE IT. Every problem has a solution. You may eventually think of a better solution than the one we suggest. But just start with the suggestions we give you.

What is good communication? We are going to suggest a very simple way of thinking about communication. Then we will suggest ways to improve communication.

First imagine a speaker who has an intention of what he wants to communicate to the listener. He sends a message and that message has an impact on the listener. Good communication means having the impact you intended to have, that is, intent equals impact. In other words, good communication is clear and precise.

The speaker tries to clarify the intent of his message by stating exactly what he's thinking, wanting, or feeling. He does not assume the listener "knows" what is going on in his head. He tells the listener, so the listener doesn't have to guess or mind-read. The good listener tries to make sure that the intent of the message is understood and does not fill in gaps with guesses as to what is going on in the speaker's mind.

Both partners are trying to make sure that intent equals impact. One reason that impact sometimes does not equal impact is because of the speaker's way of sending the message. A message must pass through the speaker's filter and come out in a particular way. For example, if you come home in a bad mood, you may say something to your spouse or family member in a harsh way when you actually are mad at someone else. You may even be unaware of sounding cross. Sometimes when you are in pain, you feel irritated and angry at the pain, so when you say something to someone else, it sounds as though you're angry and irritated at him or her, even though that is not the intent of your message.

Another reason why intent does not equal impact is that the listener may not hear the message the way it was delivered. The message must pass through the listener's filter and it can get distorted in the process. For example, if you are feeling depressed, a compliment may sound phony. It might have sounded sincere if you were in a better mood.

In any particular discussion with someone, you need to find out why communication did not occur. The only way to do this is to get feedback. Feedback is what happens when the listener tells the speaker about the impact a message had, but you have to ask for feedback. Only when you know the impact that the message actually had, and compare it to your intent, can you find out where miscommunication occurred. Unfortunately, most of us live in a feedback vacuum. We rarely get or ask for feedback. We simply always assume that intent equaled impact, and this assumption leads to hurt feelings, confusion, or a variety of other communication pitfalls. In order to have good communication, it is important to feel free to stop conversations and make sure that intent equals impact. Ask for feedback on your impacts. When giving feedback, make it clear, brief, specific, and on-topic. And remember, you're giving information to make things better, not resentments to get even. It's also important to listen to the feedback that you are given.

Another technique for being a better communicator is to summarize and validate. Paraphrase in your own words both the content and the feeling of what you heard the speaker say. You must

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get into your partner's shoes and see how reasonable it is for your partner to feel the way he or she does. Communicate this reasonableness. This is very hard to do, especially when you yourself feel hurt or not listened to.

Also, to be a good communicator, check and make sure impact equals intent. When there is something important that you need to get off your chest with someone, it's important to choose one area and state it as follows: "When you do X in situation Y, I feel Z."

Be specific about X, Y, and Z. For example, "When you don't call me to tell me you're going to be late (X) when we have an appointment (Y), I feel frustrated (Z)." This X-Y-Z formulation can help you to constructively deal with problems in all situations.

CHAPTER 5

INCREASING YOUR ENJOYMENT OF SENSUALITY

This section has one very specific goal: to communicate to you that sexual problems are like other problems in a relationship. That is, they usually have a solution.

A sexual problem is not a final end state like a terminal illness. You may think, "What kinds of people become impotent or have other sexual problems?" The answer is that all kinds of people do, especially people with chronic pain.

If you have a serious back problem or other chronic pain problem, you already know that pain is only part of the stress you must live with everyday. You may also have a loss of employment, a loss of recreation, and other changes in almost every aspect of your life.

One of the biggest changes with which you are likely to be faced is a change in your relationship with the people around you, particularly your family. The pain and the losses and the changes all create emotional stresses such as depression, anger, and constant worry. This can make your back pain worse. These stresses can damage communications with your spouse or other family members. No matter how strong your marriage or relationship, injury can come between partners. The stresses caused by injury can be both emotional and physical.

Pain can cause the loss of ability to have a satisfying sexual relationship with your spouse or partner. The effects of pain on sex can result in many bad feelings. This can make your other problems feel much worse. If you can restore good sexual relations with your partner, you will take a big step in reducing your stress. This in turn can reduce your pain problem significantly. This calls for you and your partner to more closely share your feelings and be willing to explore sexual techniques.

This section is a guide for both of you, the pain sufferer, and your partner to get out of the vicious cycles of pain, frustration, and failure of painful sex.

Pain can limit your physical abilities, thus limiting your sexuality. Pain does not, however, limit your sensuality. Sensuality refers to the romance and excitement of sex and can give more pleasure than sexuality. Sensuality supports a loving relationship better than sexuality.

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Sensuality is your attitude toward sex with your partner, restoring the sex lost to pain requires that you place an emphasis on restoring your sensuality.

It is vital for you to keep in mind that you are not the only one having a problem with sex. Your partner is also living with the problem. Direct, open communication is the tool that will restore good sexual relations.

The basic strategy for restoring sex calls for deliberate planning by both of you. Start by agreeing that you will put a special effort into your relationship. Go through this section together.

When you are ready, plan a date or a series of dates devoted to rebuilding a sensual relationship. Plan an evening or afternoon alone together for this. Let that planning create some sensual excitement for both of you. These things have to be planned a little bit at this stage in order to avoid failure. Plan the romance. Plan how you avoid pain and frustration.

Make a sensual and romantic atmosphere for your date. This may take the form of soft lighting, quiet music, and uninterrupted privacy. A setting other than the bedroom at night, such as an afternoon picnic in the living room, can be erotic as well as break a cycle of failure in the bedroom.

You should each let your imagination work in a non-threatening way. Gentle environment, gentle attitude, gentle touching will remove much demand from your pain and sore area and your fear of pain. Make your love environment comfortable, relaxed, and erotic. Make it special.

When your injury problem has put itself in the way of your sex life, you can use new attitudes, better communications with your partner, and new approaches to enjoying sex to not only recover what you lost, but also to build a better sex life than you had before. Keep reminding yourself that every problem is an opportunity. You could discover something valuable that you otherwise would have missed. The sex you recover may even be better than before your injury.

You want to place increased emphasis on foreplay. This will save stress on your back and increase your sexual capabilities and options. You should place an increased emphasis on the sensual preparations of lovemaking. The idea here is to express your sensuality and sexuality with more than your genitals.

Just as with back exercises, you should proceed with very small doses in the beginning and gradually build up from there as you may tolerate. Avoid sustaining any position or repeating any movement for a prolonged period of time. Proceed gently, planning to shift positions and techniques rather often. Do not let the sex distract you from protecting your back.

You should both share in this effort. Discuss it with one another. Agree that failure of any attempt to make love is NOT a setback to your relationship. Every time you try, you are expressing love and respect whether it works out or not. Always rejoice in your attempts to forget about your failures without blame to yourself or each other.

CHAPTER 6

MAINTAINING CHANGE AND CONTINUING IMPROVEMENT

The purpose of this manual has been to help you learn more effective and adaptive ways of coping with pain. It is important to remind you that pain management requires that you assume an active role where the locus of responsibility is with you. This is quite different from other types of treatment that you have received for your pain where you don't have much to do once you leave the doctor's office. What you have learned so far in this manual must become part of your everyday life in order to be optimally effective. This will involve a lifestyle change so that these skills become as automatic as other, perhaps less adaptive habits currently are.

Unfortunately, this will be easier said than done. Old habits are hard to break even when they clearly contribute to your pain. Setting goals and prioritizing them with all of your other everyday concerns is critical for maintenance and continued improvement.

Keep your own data and chart your progress. You are in the best position to determine what works best for you. Do it in a scientific way.

Reward yourself when you meet your goals. You deserve to feel good about yourself when you accomplish something that improves the quality of your life.

Try to get your spouse or "significant others" involved with these lifestyle changes. These are things that anyone can benefit from and the research shows that people maintain positive change better when they have support and involvement from their spouse or significant others. It's okay to revise what you learned in the Pain Management Therapy in ways that work best for you. Also, what doesn't work well now may work well in the future and vice versa. So maintain a spirit of experimentation!

What is your excuse?

When you don't meet a goal, or worse yet don't set one, ask yourself, "What is my excuse?" Typical justifications are "I'm too tired...I'm too busy...I feel okay so I don't need to do these things...This didn't work well last time so why bother...Other things are more important," etc. Many of these excuses admittedly have a "kernel of truth". You may, in fact, feel tired, busy, or pressed by "more important" obligations. You may feel okay now, or you may have been unable to change your pain the last time. However, the complete and more accurate truth is "I'm tired, busy, etc, and although I could practice pain management, I choose not to." The important thing is that you assume responsibility for your choices, rather than delude yourself that you are the passive victim of circumstance. It is then important to confront the consequences of the choices you make.

What does pain buy you?

As odd as it may initially sound, some people can actually be "served well" by their symptoms of pain. That is, it may serve an important function in their lives. For example, pain may be a socially acceptable excuse to avoid social or personal obligations that are unpleasant. One way to determine if this is happening is to keep a log of when pain occurs and what activities (actual or anticipated) surround them. What needs are being met by your pain symptoms? How does your pain modify how other people relate to you? Do you get attention that would not otherwise

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be forthcoming? Although pain seems as though it could be nothing but bad, a closer look may reveal that it actually enhances your life in important ways that can be powerfully reinforcing. This may or may not characterize you, and if it does, it can be to various degrees at different times. However, they are important questions to ask. If you determine that pain does buy you something, you then have to ask yourself, "What does it cost?"

Persistence is the price to success.

Your ability to manage pain and to take care of yourself is a tremendous power and privilege. You can manage what you think, how you feel, how your body reacts, and therefore the quality of your life. The power lies within you! As Albert Schweitzer said, "We doctors do nothing. We only help and encourage the doctor within."

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POSSIBLE REASONS FOR NOT DOING SELF-HELP ASSIGNMENTS
(To be completed by client)

The following is a list of reasons that various clients have given for not doing their self-help assignments during the course of therapy. Because the speed of improvement depends primarily on the amount of self-help assignments that you are willing to do, it is of crucial importance to pinpoint any reasons that you may have for not doing this work. It is important to look for these reasons that you may have for not doing this work. It is important to look for these reasons at the time that you feel a reluctance to do your assignment or a desire to put off doing it. Hence, it is best to fill out this questionnaire at that time. If you have any difficulty filling out this form and returning it to the therapist, it might be best to do it together during a therapy session. (Rate each statement with a "T" (True) or "F" (False). "T" indicates that you agree with it; "F" means the statement does not apply at this time).

- It seems that nothing can help me so there is no point in trying
- I really can't see the point of what the therapist has asked me to do
- I feel that the particular method the therapist has suggested will not be helpful.
- "I am a procrastinator, therefore, I can't do this." Then I end up not doing it
- I am willing to do some self-help assignments, but I keep forgetting
- I do not have enough time. I am too busy
- If I do something the therapist suggests it's not as good as if I come up with my own ideas
- I feel helpless, and I don't really believe that I can do anything that I choose to do
- I have the feeling that the therapist is trying to boss me around or control me
- I don't feel like cooperating with the therapist
- I fear the therapist's disapproval or criticism of my work. I believe that what I do just won't be good enough for him
- I have no desire or motivation to do self-help assignments or anything else.
- I feel too bad, sad, nervous, upset (underline appropriate word(s)) to do it now
- I am feeling good now and I don't want to spoil it by working on assignments

Other reasons (Please write them in)

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David Burns, MD and Aaron T. Beck, MD developed this form

An Introduction To What We Know About Pain

Pain! This very important English word is uttered through pursed lips and with an expulsion of air causing the speaker to pause a moment before proceeding with the next word or phrase. Everyone, regardless of age, status or economic level has experienced pain to some degree. The word can evoke fear. Experience with pain can leave lasting emotional and physical impressions. It can alter and destroy lives.

Advances in medical research and the discovery of analgesic drugs have given us some answers to questions about the origins and persistence of pain. Recent advances have led to new depths of understanding and control. We now know, for instance, that pain is not merely a passive symptom of disease. Acute pain can be a warning symptom. Persistent pain is now thought to be an aggressive disease in itself, producing changes in the brain that underlie the pathology of what we term chronic pain.

A major success story is the effect this new knowledge has had on the treatment of acute and chronic pain. However many problems remain unsolved, and there are many mysteries of chronic pain that remain unexplained and misdiagnosed.

Pain is a product of the nervous system, the most difficult component of the human body to understand. The complexity and subtlety of the nervous system can be compared to futuristic electronic circuitry--yet even the most advanced computer is primitive by comparison.

The nervous system consists of a peripheral web of nerve cells of varying diameter. A single nerve cell may be as small as 4 one-thousandths of a millimeter thick. These nerves extend throughout the body--to toes, fingers, teeth, tongue and scalp as well as to the central organs of heart, liver, lung and gut.

The nerves endlessly gather information, transmitting it to the mainframe, the central nervous system, which consists of the brain and spinal cord. The central nervous system interprets the information from the nerves and coordinates the body's response. The brain then integrates higher functions involving memory, comparison and decision-making.

As early as 400 BC, Hippocrates realized that the brain (not the heart) was the organizational center of the body, the seat of intelligence. Other Greek anatomists in the third and fourth centuries BC recognized that the nerves traveling from the skin to the spinal cord were sensory in nature, while those nerves going to the muscles affected motor response.

A nerve is a single cell consisting of a nucleus and various subcellular inclusions or organelles with the same microstructures as every other cell of the body. But the nerve cell is differentiated from other cells by having a tuft of short root-like projections called dendrites at one end of the

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cell body and a long, thin projection from the other end called an axon.

Although the cell may be only 4 one-thousandths mm in diameter, it can be astonishingly long. In an average-sized human being, for example, the nerve from the base of the spine to the tip of the toe is 3 feet long. The tip of the axon may subdivide 150 times and attach to 150 separate muscle fibers.

Most axons, however, do not end in a block of muscle and may be as short as an inch in length. These nerve cells are only a single link in a chain of nerve cells, each axon making near contact with the dendrite of the next nerve cell. The tip of the axon secretes a chemical substance known as a neurotransmitter, which aids in transmitting the nerve impulse from one cell over the gap or synapse to the next cell.

Each synapse offers a certain amount of resistance to the passage of the nerve message. This resistance gradually loses strength the farther it travels from the point of origin. Because individual nerve cells usually exist together in great numbers forming a nerve cord, a transmitting nerve cell may receive information from more than one cell type above it in the chain.

The nerve impulse is subjected to many different and, at times, opposing influences that provide a greater sensitivity and control of the nerve impulse in humans. Nerve impulses can travel in only one direction from axon to dendrite. Information is transported away from the central nervous system by motor neurons, which trigger motor activity or movement. Sensory neurons originating in the peripheral sense organs send their messages from axon to dendrite and back to the central nervous system. The two types of nerve cells exist together in the 31 pairs of spinal nerves. In English, the terms nerve and nerve cord are used interchangeably.

STIMULUS VS. PERCEPTION

The relationship between pain and injury or disability has led to the assumption that pain must be proportional to the severity of the injury. In many instances, however, this relationship fails to hold up. About 65 percent of soldiers who are severely wounded and 20 percent of civilians who undergo major surgery report feeling little or no pain for hours or days after injury or incision. In contrast, about 70 percent of people who suffer from chronic, low-back pain do not show any readily detectable injury. Clearly, the link between pain stimulus and pain perception is highly variable. Injury may occur without pain, and pain without apparent injury.

Perception of pain is a multistep process, originating at the site of insult with the stimulation of specific nerve fibers known as nociceptors. Some nociceptors react to several kinds of painful stimulation. Others are more selective. Certain nociceptors will react to a pinprick, for example, but ignore painful heat.

After these nerve fibers or nociceptors are stimulated, the damaged cells release chemical mediators of pain and inflammation. These mediators include potassium ions, bradykinin, prostaglandins, serotonin and histamine.

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The resulting sensitization of the peripheral nerve endings produces an exaggerated and prolonged sensitivity to later stimuli (peripheral hyperalgesia). Analgesic drugs such as aspirin and ibuprofen block some of these chemical mediators and decrease sensitization of nociceptors at the periphery.

The pain stimulus is then sent through the peripheral nervous system to the central nervous system, or CNS, where the pain message is processed at several levels. Touching a hot stove causes the pain signal to be routed immediately from the pain site to the dorsal horn of the spinal cord. Here it synapses with a second neuron, which picks up the signal, passes it to the other side of the spinal cord and up the spinothalamic tract to the thalamus. A message is then sent back down the spinal column to nerve cells that signal muscles to contract. That streamlined pathway is used for perception of sharp or acute pain and can be automatic as in a reflex.

An alternative pathway exists in which the neuron at the site of injury enters the dorsal horn of the spinal cord, transfers its message to the other side of the spinal cord, and then through a series of interconnected neurons, which transmit and modulate the pain message. The message travels up the spinal cord to the brain stem, the thalamus, and is finally perceived at the cerebral cortex. This slower ascending pathway allows perception of duller, more persistent pain.

Pain transmission also alerts another major division of the CNS--the autonomic nervous system. This system regulates involuntary processes such as breathing, blood flow, pulse rate, digestion and elimination, adjusting these activities to changing body needs. The autonomic nervous system also signals the release of hormones like epinephrine (adrenaline).

In 1965, Ronald Melzack, a Canadian scientist, and Patrick Wall, a British scientist, suggested a new gate theory of pain and speculated that pain-suppressing pathways must exist. Their idea was that when pain signals first reach the nervous system, they excite activity in a group of small neurons that form a kind of pain pool.

When the total activity of these neurons reaches a certain minimal level, a hypothetical gate opens to allow the pain signals to be sent to higher brain centers. However, nearby neurons in contact with the pain cells could suppress the cells so that the gate stayed closed. The gate-closing cells include large neurons that are stimulated by non-painful touching or pressing of the skin. The gate also could be closed from above by brain cells activating a descending pathway to block pain.

This theory stimulated research to find the conjectured pathways and required mechanisms. For some time, neuroscientists knew that chemicals were important in conducting nerve signals (small bursts of electrical current) from cell to cell. Since serotonin was first identified as an inhibitory neurotransmitter in the early 1970s, scientists have discovered other neurotransmitters that inhibit pain. These include the opioid peptides, beta-endorphin and met-enkephalin.

All of the most potent pain-relieving drugs, called opioids, have the same effect as opium, with similar chemical characteristics and structure. Morphine is the purest, most active alkaloid of opium. The opioid receptors are found near synapses in the dorsal horn of the spinal cord. But

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these and other neurotransmitters have been traced to receptor sites throughout the body, including pathways in the face, and are believed to be involved in a pain-control network. These opioids serve as ligands or signals that bind with specificity and tenacity to their opioid receptors. In this way, they induce a signal transduction pathway in the responding neuronal cell.

ACUTE VS. CHRONIC PAIN

Pain is generally divided into two main types: acute and chronic. Acute pain is often short-lived. It has a specific cause and purpose, and generally produces no persistent psychological reactions. Acute pain can occur as a result of such things as tooth extraction, soft tissue injury, infection and inflammation. It can be modulated and removed by treating its cause and through combined strategies using analgesics to treat the pain and antibiotics to treat the infection.

Chronic pain is distinctly different and more complex. Chronic pain has no time limit, often has no apparent cause and serves no apparent biological purpose. Chronic pain can trigger multiple psychological problems that confound both patient and health care provider, leading to feelings of helplessness and hopelessness.

The urge to do something--anything!--to stop pain makes some patients drug-dependent. It drives others into repeated operations and submits many to the mercies of anyone promising a cure. Chronic pain may be the most costly health problem in the United States. Estimated annual costs--including direct medical expenses, lost income, lost productivity, compensation payments and legal fees--are close to \$50 billion. Some of the most common causes of chronic pain include:

Low-back pain. About 15 percent of US adults have persistent low-back pain at some time in their lives. Five million Americans are partially disabled by back problems and another 2 million are so severely disabled that they cannot work. Low-back pain accounts for 93 million lost workdays and costs more than \$5 billion in health care each year.

Headache. At least 40 million Americans suffer chronic, recurring headaches. They spend \$4 billion a year on medications. Migraine sufferers alone lose 65 million workdays each year.

Recurrent facial pain: An estimated 7.5 million people--about 4 percent of the US population aged 18 years or older--report pain in the face or jaw joint. Of these, 5.2 million are women, accounting for about 5.5 percent of the US female population; 2.2 million are men, about 2.6 percent of the US male population. The estimated non-surgical direct costs for treating recurrent facial pain amount to about \$874 million each year. The annual direct cost of treating patients with temporomandibular disorders--excluding surgery and medications--is at least another \$1 billion.

Cancer pain. Most cancer patients in the intermediate or advanced stages of the disease suffer moderate-to-severe pain. More than 800,000 new cases of cancer are diagnosed each year in the United States, and some 430,000 people die.

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Arthritis pain. The greatcrippler affects 20 million Americans and costs more than \$4 billion each year in lost income, productivity and health care. Osteoarthritis may be significant in the etiology and pathogenesis of TMD.

Other pain disorders cost society many billions of dollars. These disorders include the neuralgias and neuropathies (diabetic and post-herpetic) that affect nerves throughout the body; pain triggered by damage to the central nervous system (the brain and spinal cord); and pain having no readily apparent cause.

Many chronic pain conditions affect mainly older adults. These include arthritis, cancer and angina. Tic douloureux (trigeminal neuralgia) is a recurrent, stabbing facial pain that is rare among young adults but becomes more common with increasing age. Today, 32 million Americans are 65 years of age and older. By the year 2010, about one in five Americans will be 65 or older.

These facts make chronic pain a remarkably significant area for our concern and clinical attention. Our challenge is how to best manage chronic pain.

MANAGING PAIN

For those of with responsibilities in health care, pain often creates a difficult situation. It is easy to be tricked by the source of the pain stimulus. The physician/practitioner wishes to help a patient with severe pain in a particular region, but can find nothing apparently abnormal.

The pain persists. Something must be done. In a few cases, all available techniques are tried to no avail. It is difficult to explain to a patient that the pain may be due to injury or disease not at the site where it is perceived, but rather at some other site. The problem may not be a result of the injury/illness site but referred pain. The possibility of referred pain caused by some other condition--trigeminal neuralgia, for example, or diabetic neuropathy--is not easy to diagnose and can be presented as another problem. It is the diagnosis that must be considered.

Pain management has long been important in health care, where there is heavy emphasis on pain prevention and control. There are many procedures advertised for pain control. Most have their advocates, some detractors and many skeptics. When effective, these procedures can transform the life of a person plagued by chronic pain. But before complicated pain treatments are attempted, a variety of simpler treatments should be tried.

Heat treatment can help by dilating blood vessels in the affected area, removing local pain-causing substances and possibly closing the pain gate or just causing relaxation and comfort. More attention should be given to the psychosocial, behavioral and functional aspects of chronic pain. If these methods do not help, other treatments may help:

Acupuncture. Although the Chinese have used this technique for 2,000 years, it remains controversial. The technique involves inserting fine needles under the skin at selected points and agitating them. The acupuncture mechanism is not well established, although it is believed that the procedure excites an endorphin method of pain control. Some experiments have shown high levels of endorphin in the cerebrospinal fluid after acupuncture.

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Local electrical stimulation: Applying brief pulses of electricity to nerve endings under the skin in the affected area--a procedure called transcutaneous electrical nerve stimulation, or TENS--reportedly gives excellent pain relief to some chronic pain sufferers. Frequency and voltage are important in achieving the sense of tingling and warmth that provides relief. Relief is believed to result from the stimulation of large-fiber activity that can close the pain gate. The TENS device can be small enough to be worn on a belt and used when necessary.

Brain and spinal cord stimulation: Surgically implanting electrodes in areas of the brain rich in opiate receptors has been done mainly in-patients with widespread and severe cancer. Electrodes have also been placed onto the dorsal columns of the spinal cord, where they are believed to stimulate the large fibers involved in pain modulation. The patient operates the transmitter when relief is needed.

Placebo effect. Experiments suggest that the placebo effect may be neurochemical. Those who respond to a placebo for pain relief--a remarkably consistent 35 percent in any experiment using placebos--are believed to be able to tap into their brain's endorphin system, naturally inhibiting pain transmission.

Surgery. Surgical pain relief may involve cutting a nerve that supplies the painful area. This usually involves some sensory loss and possibly some motor loss.

Psychological treatment. Such treatments range from cognitive-behavioral pain management therapy and other forms of psychotherapy to relaxation training, meditation, hypnosis, biofeedback and behavioral modification. Underlying these approaches is the belief that patients can do something to control their own pain. Understanding how unconscious forces and past events contribute to their fears and pain is helpful for some people in providing relief. Changing behaviors, attitudes and feelings about pain may aid other chronic pain sufferers.

Analgesics. The use of analgesics or pain-killing drugs is a \$30 billion-a-year business in the United States. These medications are effective in treating acute pain and often work in treating chronic pain as well. In 1750, the Rev. Edward Stone of Chipping Norton, England, isolated from a willow tree the first of a group of analgesic drugs derived from salicylic acid (from the Latin "salix," which means "willow"). The acetylated salicylic acid, having fewer side effects than Rev. Stone's original, is better known as aspirin. It has become the most popular, effective, universally used reliever of pain.

Scientists cannot explain as yet all the ways aspirin works, but it is known to interfere with the transmission of pain signals in the peripheral nociceptive nerve endings. Aspirin also inhibits the production of chemicals manufactured in the blood and released in injured tissue. These include prostaglandins, which contribute to inflammation at the injury site and result in pain.

Aspirin and other drugs used in treating inflammations (examples: phenylbutazone and indomethacin) were shown by John Vane in 1971 to inhibit the action of the enzyme that converts arachidonic acid to prostaglandins. Arachidonic acid metabolites acting in the brain also produce fever, explaining the effectiveness of aspirin in reducing fever.

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SYNTHESIS

One of the earliest forms of analgesic was the drug opium, popular even before the times of the ancient Greeks. Opioid receptors are found in the dorsal horn of the spinal cord near the neuron synapse region, where they effect the production of pain sensation.

Opiate-related compounds include codeine, propoxyphene (Darvon), morphine, heroin (diacetyl morphine) and meperidine (Demerol). All provide stronger pain relief than aspirin and some other nonsteroidal analgesics. The opioids, however, have some well-known potential for abuse and may have unpleasant and harmful side effects.

Because these drugs do not have an efficacy ceiling like that of the nonsteroidal analgesics, the dosage can be increased. Doing so also increases the side effects, including respiratory depression. In combination with other medications or alcohol, some of the opiates can be very dangerous. Used wisely, opiates are important agents in the chemical fight against pain.

Our challenge is to discover nonopiate drugs that have the same specificity and efficacy for managing chronic and severe pain.

Local analgesics or nerve blocks may be effective for temporary pain relief when the pain is restricted to a well-defined area. Lidocaine (lignocaine) is often used to treat trigger spots where injections are made into painful areas of muscle.

Certain anti-depressants as well as anti-epileptic drugs also are used to treat severe pain conditions, including shingles and facial neuralgias. The anti-depressants are believed to increase the production of serotonin. Cells using serotonin are an integral part of a pain-controlling pathway that inhibits pain-conducting neurons in the brain or spinal cord.

The use of anti-epileptic drugs centers on the premise that the nervous system depends on a proper balance of incoming and outgoing nerve signals. In damaged facial nerve cells, the normal flow of messages to the brain is disturbed and becomes hyperactive. Excessive nerve discharges may occur. The anti-epileptic drugs may reduce the excessive frequency of discharges.

In a nation with an aging population, there is an increasing challenge to reduce chronic and debilitating diseases. Pain is a disease, not just a symptom. It results in pathology within the nervous system, which can affect all the systems of the body. Chronic pain can have enormous cost, for the individual patient and society as a whole. The health care profession has always been proactive in pain prevention, management and research. Although enormous progress has been made in understanding the molecular and cellular neurobiology and the neuroscience of pain, our knowledge of this elusive and complicated system is still fragmentary. Pain remains one of our most challenging and important problems in research and health care.