Because of its negative and ubiquitous nature, pain has demanded an explanation throughout history. Conceptual models have thus been developed to aid in comprehending pain. These have been based on various religious, philosophical, political and cultural as well as scientific considerations. In order to understand and accept the scientific models of today, we need to understand how historical models continue to exert influence on our thinking. In this chapter, a brief history of pain models will be presented and then a modern model will be outlined that sets the framework for this book. A case study will also be introduced to help us apply the models to patients and their problems. In this way we may contrast past beliefs about pain with our present knowledge about pain from a scientific perspective.

As we can see from the case study, Hank’s back pain has developed into a considerable problem that affects him and his family dramatically. An important question is how we might best understand Hank’s problem in order to provide the best care possible. Let us examine this by looking historically at models of pain and progressing to a modern view of pain and disability.

PAIN AND PUNISHMENT

Today pain is viewed with compassion and we seldom think about moral or religious implications that may put the sufferer to blame for his or her pain. However, in several historical models of pain, the word “pain” is related to punishment and suffering, and this is sometimes seen as a consequence of...
CASE STUDY: HANK

In order to visualize the problems patients may face with pain, let us consider a particular case. This will also help us to illustrate the principles to be underscored throughout the book. This case study is based on a composite of clinical experience and would be a typical scenario for back pain patients seeking rehabilitative care.

Hank is a 44 year old who suffers from neck and back pain. He is married, the father of two boys (9 and 12) and one girl (8). The family live in their own home. They enjoy an active family life with friends and relatives and participate in several sports. Hank has a high school education and has worked in construction for 20 years. His wife is also employed part-time at a large grocery store.

About 2 years ago Hank hurt his back. He was surprised that he could not relate the onset of the pain to a specific event. Instead, he woke up with a stiff back that got progressively worse during the day. Hank’s back ached as it occasionally had done earlier such as after a sporting event. However, at inception Hank also felt a sharp pain that made him wince. He felt as though someone was sticking a knife in his back. Every movement of the back seemed to exacerbate the pain and it sometimes caused a shooting pain. Bending and twisting movements resulted in a sharp jolt. Naturally, Hank wondered what was wrong with his back. He had never felt anything like this before.

He was concerned that something serious must have happened to his back. Since the pain felt like a knife and was at times shooting, he wondered if a nerve might be pinched. Moreover, as movement seemed to set off the bouts, he thought a vertebra might be damaged or chipped. He was concerned that a nerve might be severed leaving him permanently injured. With encouragement from his wife, he rested and made an appointment with his doctor.

The doctor briefly examined Hank and listened to his complaints. However, the doctor could not say exactly what the cause of the pain was although she did find tight, sore muscles in the lower back region. Instead, she said that back pain was common and he would likely recover within a few weeks. She said that this often happened to men doing manual labor and that it would be helpful to give the back a rest. Given the severity of the pain, the doctor also prescribed a painkiller and provided a certificate so that Hank could be off work for a week.

However, after a week the pain still had not subsided. Although a little better, Hank still had considerable pain. He tried to take it easy and spent some time resting every day. Hank also attempted to return to his work. However, this was not easy as his work required lifting, carrying, hammering, and bending and twisting. Hank felt handicapped and that he could not “hold his own” on the job. This put Hank in a difficult position as the company needed to complete the current building project within the next week and much was left to do. After one particularly stressful day at work, Hank’s back pain increased significantly that evening. Consequently, he visited his doctor again the next day. The doctor said she would increase the painkillers and extend his sick leave another 10 days.

After resting the additional 10 days, Hank again returned to work. Fortunately, he now felt better. He tried to be careful at work so as not to strain his back and at home he rested. His wife encouraged him to take good care of his back and she and the children pitched in to do some of the chores that Hank normally took care of. Thus, a new routine was developed that Hank and his family trusted would be helpful.

However, after working a couple of weeks, Hank suffered a relapse. Once again he felt a sharp pain and his back really ached. Hank was frustrated and angry that this should happen again when he had worked so hard to avoid a new injury. When Hank returned to his doctor, she was quite concerned. As a result, she ordered images of the back to be taken, provided a stronger pain medication, and advised Hank to be careful with movements that might hurt the back. She provided an additional certificate for sick leave and provided Hank with a referral to a physical therapist. The physical therapist was to provide some pain relief as well as instruction about working in an ergonomic manner.

Unfortunately, Hank suffered more relapses. Each time he received more treatment in the form of medications, some time out from work and physical therapy. Although Hank appreciated these treatments because they made him feel better, they did not really cure his pain. Instead, Hank felt that the pain was getting progressively worse. He now had pain more or less the whole time.

Furthermore, the medications and physical therapy seemed to be having less and less effect. In addition, Hank was finding it difficult to do a number of things. For example, he could no longer participate in sports and he found it hard to do several of his normal household duties. Hank also found it demanding to keep up with social activities such as visiting friends and relatives and going to sporting or cultural events.

Because the pain seems to be getting worse rather than better, Hank feels he must do something. In point of fact, he is convinced that something must be wrong that the doctor has not yet discovered. He is well aware that increases in activity normally result in an increase in pain.
sins or misbehavior. In fact, the Latin root word *poena* means punishment. Yet, to this day, the word is coupled with blame, chastisement, discipline and anguish (Morris, 1999). Almost all religions have addressed human suffering and pain. Pain is often believed to originate with the gods. In Christian writings pain has often had contradictory meanings. On the one hand it appears to be the result of sin, that is, pain is viewed as a form of divine punishment. Certainly, various painful illnesses have been viewed with a moral over-tone. Morris (1999) points out, for example, that gout (a congenital form of arthritis) was once viewed with contempt much as venereal disease is today because it was associated with the lavish lifestyle of the rich and decadent. On the other hand, pain can be viewed as a trial or test of a person’s faith. For example, in one notion, pain is seen as a wound that God inflicts, lovingly, to humble and to discipline the restless spirit (Morris, 1999). Similarly, just as Jesus suffered on the cross, so pain might be a trial where the victim is suffering for a cause. Remnants of these views are not only seen in models of pain, but may form the base for some of the beliefs patients hold about their pain.

"Lust and pain are like twins, they are joined and where the one appears, the other is close by" (Leonardo da Vinci).

In some cultures it is a great merit to have survived great pain. Thus, hunters, warriors and the like who have actually survived a painful ordeal are prized. This may represent hardiness, but also seems to reflect moral purity. This seems to be related to a number of rituals and ceremonies where participants self-inflict great pain in order to reach higher religious status or overcome some perceived evil. In one tribe of American Indians, warriors expose themselves to rattlesnake bites in a ceremony. Survivors are said to be pure and obtain great status in the tribe.

Historically, pain has been explained by factors ranging from magical fluids to the work of the gods (Fig. 2.1). Indeed, each culture appears to have a rather unique explanation which is also a product of the time. The Greeks attempted to develop several aspects of their model of pain. For example, Hippocrates asserted that pain was the result of imbalances in the vital fluids. Aristotle, on the other hand, asserted that pain was due to evil spirits and the gods. These entered the body via an injury. The brain was not believed to have any direct influence; for years the heart was considered to be the center for pain sensation.

Figure 2.1 Culture influences our perception of pain and our expectations concerning treatment. This pain mask from Sri Lanka (Abutasanniya) is designed to frighten away evil pain and disease spirits. (Mask: painting by Peter Ekström.)
Descartes and the Cartesian “mind–body” model

René Descartes (1596–1650) was a philosopher whose mission was to show that humans are a mechanical body governed by a rational soul. According to Descartes, the nerves were hollow tubes through which spirits flowed in a mechanical manner. Further, the nerves were connected to the brain and the brain was the center of the senses. In order to explain pain, Descartes put forward an example as a model (Fig. 2.2). In this example, a man whose hand is being hit by a hammer serves as the injury. A hollow nerve path is also shown from the injury to the brain and this was compared to the pulling of a rope to make a bell strike on the other end. Although several aspects of the model were correct and well advanced given the scientific evidence of the time, the model also advanced a rather mechanical, dualistic view of mind and body. Indeed, pain was viewed as an injury causing a mechanical-like rope to be pulled which rang a bell in the person’s mind. The body was like a machine, then, which could be explained by the laws of nature. Yet the body was governed and controlled by the rational soul.

Hurt is harm

To this day, Descartes’s model of pain continues to exert influence on how people view pain. First, and most straightforward, is the assumption that there is a direct link between the amount of tissue damage and the level of pain experienced. In other words, the more damage incurred, the greater the pain. As we will see later in the book, this is a view patients frequently hold. Moreover, it appears to feed the idea that all pain is caused by injury, so that increases in pain are interpreted as the result of additional organic damage. There is an intuitive appeal to this assumption and obviously tissue destruction is an important element in pain perception. However, as this book aims to make clear, a host of factors actually determine the experience of pain intensity.

The division of mind and body

A second assumption in the Descartes legacy is the division of mind and body where pain is consequently considered to be either strictly physical or strictly psychological. Indeed, throughout the twentieth century, doctors attempted to distinguish between true physical and psychologically derived pain. Unfortunately, when pain symptoms were difficult to treat or even understand, the question arose as to whether the pain actually was caused by a psychological condition. The implication was that the patient was mentally ill rather than physically ill. While this may have provided the medical professions with a method of dealing with some difficult cases, it does not seem to have helped patients very much. Accordingly, the distinction appears to have taken on social meaning. There still seems to be a certain amount of apprehensiveness about considering pain from a psychological perspective.

A corollary of the idea that pain is either physical or psychological is that the pain from true injury cannot be controlled or influenced by any other means than physical ones. Thus, the patient is a slave to the physical injury and is in need of physical treatment to relieve the pain. Yet psychological techniques offer additional tools in the treatment arsenal and in several situations may be the only feasible intervention available.

AN INTEGRATIVE, PSYCHOLOGICAL MODEL OF PAIN

A modern and scientifically based model has been developed over the past few years that incorporates biological, cognitive, emotional, behavioral, and to a great extent even social aspects of pain perception. Although the model involves many aspects, its focus is on psychological processes and it may be used as a heuristic aid. Let us explore an overview of the model here, before delving into the details in the coming chapters.

What is pain?

To appreciate a more psychological model of pain perception there is a need to consider what pain is and we need to attempt to define it. This is a surprisingly difficult task for a word that most of us intuitively understand. However, pain may have many meanings and the large number of words that may be used to describe pain underscores this point. One way of
looking at historical models is to examine the words used in them. It is interesting to note that a distinct word(s) for pain appears to be of relatively recent origin. Moreover, as noted above, the word for pain is derived from punishment in Latin and associated with punishment in several other languages. Words are essential in developing a model as this is one of the main methods we use to communicate our pain. Normally, we use adjectives to describe our pain ("feels like a cut, pressure, sting") rather than different synonyms (pain, hurt, ache). Adjectives help us to describe our pain from a physical and emotional standpoint. This fact was utilized in making the McGill Pain Questionnaire (Table 2.1) (Melzack, 1983). This instrument is a valuable tool in pain assessment. It employs a variety of descriptors in an

<table>
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<tr>
<th>Sensory words</th>
<th>Temporal</th>
<th>Spatial</th>
<th>Punctate pressure</th>
<th>Incisive pressure</th>
<th>Constructive pressure</th>
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<tr>
<td>1. flickering</td>
<td>jumping</td>
<td>pricking</td>
<td>sharp</td>
<td>pinching</td>
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<td>2. quivering</td>
<td>flashing</td>
<td>boring</td>
<td>cutting</td>
<td>pressing</td>
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<td>3. pulsing</td>
<td>shooting</td>
<td>drilling</td>
<td>lacerating</td>
<td>gnawing</td>
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<td>4. throbbing</td>
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<td>stabbing</td>
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<td>5. beating</td>
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<td>lancinating</td>
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<td>6. pounding</td>
<td>Traction pressure</td>
<td>Thermal</td>
<td>Brightness</td>
<td>Dullness</td>
<td>Sensory misc.</td>
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<tr>
<td>1. tugging</td>
<td>hot</td>
<td>tingling</td>
<td>dull</td>
<td>tender</td>
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<td>2. pulling</td>
<td>burning</td>
<td>itchy</td>
<td>sore</td>
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<td>3. wrenching</td>
<td>scalding</td>
<td>smarting</td>
<td>hurting</td>
<td>rasping</td>
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<td>searing</td>
<td>stinging</td>
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<td>splitting</td>
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<td>heavy</td>
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<td>Affective words</td>
<td>Tension</td>
<td>Autonomic</td>
<td>Fear</td>
<td>Punishment</td>
<td>Affective misc.</td>
</tr>
<tr>
<td>1. tiring</td>
<td>sickening</td>
<td>fearful</td>
<td>punishing</td>
<td>wretched</td>
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<td>2. exhaustive</td>
<td>suffocating</td>
<td>frightful</td>
<td>grueling</td>
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<td>terrifying</td>
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<td>killing</td>
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<td>Evaluative words</td>
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<td>1. annoying</td>
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<td>2. troublesome</td>
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<td>3. miserable</td>
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<td>4. intense</td>
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<td>5. unbearable</td>
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<td>Miscellaneous words</td>
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<tr>
<td>1. spreading</td>
<td>tight</td>
<td>cool</td>
<td>nagging</td>
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<tr>
<td>2. radiating</td>
<td>numb</td>
<td>cold</td>
<td>nauseating</td>
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<td>3. penetrating</td>
<td>drawing</td>
<td>freezing</td>
<td>agonizing</td>
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<td>4. piercing</td>
<td>squeezing</td>
<td>tearing</td>
<td>dreadful</td>
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<td>torturing</td>
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attempt to capture the pain the patient is experiencing. It was constructed by examining which words were actually used to describe pain in the English language. This was no small task as the researchers compiled a list based on a variety of sources such as clinicians, information from the literature and interviews with patients. Words were then grouped together by empirically studying how patients actually used the words. The final scale consisted of 20 subclasses. The sensory aspects of pain were captured with 42 words in 10 different classes. In addition, 14 words in five categories cover the affective aspects. Finally, the evaluative parts produced 5 words in one category, while various miscellaneous aspects consist of 17 words in four classes. In the clinic, patients are asked to select one word from each category that describes their pain.

Since pain may be described in so many different ways, with so many different words, it appears difficult to define and measure. We speak of pain when describing a wide variety of things such as a cut, a toothache, a muscle ache, or even when we have been disappointed (“it really hurt when I realized I was wrong”) or at the loss of a loved one. How can all of these seemingly different things still be called pain?

Fortunately, an international organization has studied this problem and developed a working definition for healthcare professionals. The definition provided by the International Association for the Study of Pain is: An unpleasant sensation and emotional experience which is associated with actual or potential tissue damage or is described in terms of such damage and which is expressed in behavior. Thus, pain is recognized as having many facets. It includes psychological aspects as well as biological and is truly a multidimensional phenomenon. I have added the underlined words to the definition to underscore that the way we communicate pain to others and an important consequence of the pain experience is behavior.

Feeling no pain
A central goal for healthcare professionals is to relieve pain. In many healthcare situations it would seem that pain is an evil to be gotten rid of. However, even though it is rare, a few people are born with no feeling for pain. While this might seem positive from the perspective of a pain patient, it has dire consequences. The study of people who feel no pain, that is, who have congenital insensitivity to pain, has had a substantial impact on modern models of pain. To be sure, pain seems to serve the imperative role of the warning signal.

Insensitivity to pain is an ominous handicap. These people often die in childhood as a result of illnesses or injuries they have not noticed. Thus, there seems to be compelling reasons to view pain perception as having immense survival value. Pain in fact protects us from the complications of dangerous tissue damage.

Interestingly, congenital insensitivity to pain has two main forms (Nagasako et al., 2003). In the first form, congenital insensitivity to pain, patients do not perceive sensations of pain. Thus, they have a marked inability to distinguish the intensity, type or quality of the pain. This appears to be a hereditary disease where there is an abnormality in the autonomic nervous system (hereditary sensory and autonomic neuropathy: HSAN). These patients may have considerable injuries, but with no apparent experience of pain. For example, patients may have painless burns or painless mutilated or broken fingers.

The second form is congenital indifference to pain. As the name suggests, these people can discern the type, intensity and quality of the noxious stimulus. Thus, the ability to detect various adverse stimuli is intact, but the individual does not respond with pain behaviors. Typically, these individuals have painless injuries, but normal results on sensory and neurological examinations. One case (Landrieu et al., 1990) reported on a 5-year-old girl who had painless fractures and indifference to other injuries. While she did exhibit withdrawal reflexes and even grimaces to pinpricks and hot water stimuli, she was all the same indifferent to prolonged or repeated application of the painful stimuli. Nevertheless, she had normal neurological findings including a biopsy of the nerves and she had normal psychomotor development. Some patients even seem to lack the specific emotional aspects of a pain response. Such individuals may lack responsiveness to intense noxious stimuli such as having no withdrawal responses, no pain behavior, and sometimes even inappropriate responses suggesting pleasure.

The description of people with congenital insensitivity to pain has fascinated pain researchers and provided an impetus for the construction of models. It underscores the importance of pain in survival. Moreover, the various types of insensitivity suggest that pain perception is more than simple nerve stimulation. In fact, insensitivity to pain was one of the main bases for the distinction between sensory and affective aspects of pain in the development of modern models (Nagasako et al., 2003).

Biopsychosocial model
Scientific research has clearly shown that many factors influence our pain perception; pain is not simply a neurophysiological phenomenon. To emphasize this, consider Fig. 2.3 where selected factors that are known to influence pain perception are shown to the left.
The family also plays an important role in our experience of pain (Keefe et al., 1996; Kerns and Payne, 1996). First, parents teach their children a good deal about how one should react to pain and they serve as important models. The foundations for decisions such as the need to take a pain tablet or to see a doctor are laid here (Edwards et al., 1985). Not only do children from families where a parent has a chronic pain problem have a higher rate of pain problems, but some research suggests that these children learn inappropriate coping strategies from their parents (Turkat, 1982).

Second, the family constitutes a powerful source of feedback. Just as with social feedback in general, the family may be instrumental in shaping pain perceptions. This is true for adults as well as for children. For example, family members may encourage “sick behavior” by suggesting a course of action (“you should probably take a tablet and rest”) as well as by providing feedback (“you seem to be a bit better after your rest”). This can significantly contribute to the development of sick behavior. On the other hand, family members may encourage appropriate coping strategies and be a most powerful positive help. This is why some practitioners include the family in the treatment of persistent pain (Kerns et al., 1990; Keefe et al., 1996; Kerns and Payne, 1996). One particular method is to teach spouses appropriate ways of prompting appropriate behavior as well as to provide encouragement for them.

**Temporal aspects: acute, subacute, recurrent and persistent pain**

Any model of pain needs to deal with the temporal aspects because the length of the suffering has far-reaching implications. Certainly, the temporal aspects of pain influence our perception as intermittent pain is clearly different from nonrelenting pain. Similarly, the length of time we have experienced the pain influences our perception. Thus, the various factors that influence pain may work differently depending on the point in time considered. These temporal aspects then have essential consequences for our understanding of the pain problem.

One basic temporal distinction is the length of suffering on the acute to persistent pain time line. Here pain is viewed on a continuum and an assumption is that the pain is experienced during the entire time period. Keep in mind that the description here is primarily focused on patients with musculoskeletal pain, although many of the attributes are true for most pain sites. *Acute pain* is generally defined as pain experienced up to about 3 or 4 weeks. It is characterized by temporary decreases in activity, reliance on medication

![Diagram](Figure 2.3) **A large variety of factors influence our perception of pain. The experience of pain includes subjective, behavioral and physiological aspects.**

The figure also underscores that pain perception involves physiological but also cognitive (subjective) and behavioral aspects. Indeed, it is important to remember that pain perception involves how we process and react to physiological stimuli.

Figure 2.3 emphasizes the so-called biopsychosocial approach to pain. The sensory stimulus associated with injury is a central input on the left-hand side. However, social and psychological aspects have also been selected for inclusion. To be sure, social aspects set the framework for how we react to pain. They determine what is acceptable as well as what is taboo in how we deal with pain. Our culture, for example, sets boundaries for how we experience and describe our pain. Several research reports highlight the fact that people from different cultural heritages respond somewhat differently to painful stimuli (Moore and Brödsgaard, 1999). There is considerable evidence, for example, of distinctive ethnic variations in the experience of pain (Moore and Brödsgaard, 1999; Morris, 1999). This includes how much pain is tolerated, but more importantly how the pain is interpreted and dealt with. Several cultural “rituals”, for example, involve what we might consider to be tremendous pain, yet they are done voluntarily and with great vigor. Consider the traditional Sun Dance performed by Native Americans. In this dance, young men receive cuts in the chest area and thongs are slipped through these and then tied to a pole. The dance may continue for hours as the men tear their flesh to break free; pain is central to this ordeal and has a specific cultural meaning.

Another example of social and cultural influence is the description of our pain and what it means. Skevington (1995) points out, for example, that most patients rehearse and develop their description of their pain. In particular this is done through interactions with others. This provides social feedback that shapes our view and presentation of the pain. For example, describing some leg pain as feeling like a “gooey glob” would certainly get a different response from friends, relatives and workmates than describing it as “tender and sore”.

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**Models of pain perception**

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**Figure 2.3** A large variety of factors influence our perception of pain. The experience of pain includes subjective, behavioral and physiological aspects.
or other pain relief methods, and help seeking. It is accompanied by psychological distress, for example, anxiety, worry and feeling blue, in addition to beliefs that pain is controllable through medication and active coping. Biologically the patient may have various organic findings including soft tissue mechanisms such as muscle spasms. In the next stage, subacute pain, considered to be between 4 and 12 weeks, patients may exhibit altering patterns of increasing and decreasing activity and withdraw or become reliant on medication. They often attempt to continue working and use various coping styles. Pain of varying intensity is experienced and depressive symptoms may begin to develop. Patients tend to focus on the physical symptoms and these are affected by stress. Anxiety may persist and anger and frustration are common. As time passes, the likelihood of finding organic pathology decreases. In persistent or chronic pain, defined as more than 3 months’ duration, activities may have decreased sharply, patients may “doctor shop” and overuse medications. As these lifestyle changes become stable the person may fall into a sick role. The pain usually becomes more constant, although patients may experience “good” and “bad” periods. Depression and passive coping strategies as well as a preoccupation with symptoms are common, as are beliefs that the patient himself has no control over the pain. From a biological point of view there are few distinct findings, but the patient may suffer from chronic spasms, and decreased muscle strength and endurance.

Although the above stages of pain development underscore the time line, the assumption that pain is experienced continuously in the same way is mistaken. Instead, the experience of pain is dynamic and it is normal to experience increases as well as decreases.
It is also typical to experience periods of little or no pain followed by periods of considerable pain.

**Does pain always cause disability?**

Pain sometimes results in considerable disruption of our daily activities. Certainly, as seen in Chapter 1, pain is a frequent reason for not being able to work. Consequently, the patient may be considered disabled and the implication is “disabled by the pain”. However, although disability is often considered to be a direct result of pain, modern research indicates that pain and function are not always closely related.

The idea of disability due to injury is a relatively old one that is based on the traditional medical model. This approach originated in Prussia during the nineteenth century and developed in parallel with the “disease model” (Waddell, 2002). In this system, symptoms and signs obtained during the examination are used to infer an underlying injury and a diagnosis is given. Based on this diagnosis, treatment is then provided aimed at alleviating the underlying injury. Once treatment is provided, the patient is expected to recover rather quickly. However, even if cured, some residual disability could be present as a result of the disease process (such as scar tissue or weakness). An extension of this system is that disease causes physical impairments that in turn result in disability.

The question is whether this is absolutely true.

During the past two decades evidence has emerged suggesting that physical function, disability and pain may not be as strongly linked as previously thought. In other words, although we would expect some relationship, pain and injury may not be 100% related to function or disability. Certainly, some patients may continue to work despite considerable pain, while others may find it difficult to work even though they suffer less pain. A good deal of light has been shed on this question for low back pain. One reason that scientists began exploring the relationship was that there is frequently no medical evidence of anatomical damage (e.g. damaged nerves or bones) in patients with long-term disability (Nachemson and Jonsson, 2000; Waddell, 2002). Studies also began to be published demonstrating that pain was not crucially linked to function. For example, it has been found that for every patient off work with back pain, there are at least two with the same pain intensity and duration in the general public who are not off work (Linton et al., 1998). While there is no doubt that pain and function are related, there is a question as to the strength of the relationship.

Some studies showed that pain was not strongly related to work disability for back pain. The point was driven home to us in an epidemiological study we conducted aimed to elucidate back pain in nursing personnel in relation to their workplace (Linton and Buer, 1995). We examined licensed practical nurses (LPNs) and nurses at a large hospital and assessed their pain, work environment, and psychological and physical status. Interestingly, we were able to match a group of nurses all of whom reported moderate to severe pain, often or all of the time. However, some of these nurses had been off work during the preceding year (about 90 days average), while the others had not. This in itself was a surprising finding. We set out to determine which factors were related to the work disability. An examination of the work environment showed that the physical work performed by the two groups of nurses was quite similar. Further, the physical exam showed tight hamstring muscles, but these were also very similar in the two groups.

What then might explain the differences in disability? In the final analysis, we saw that psychosocial factors could explain the difference between the two groups. Those off work tended to react more emotionally toward their pain, and employed more passive coping strategies. Thus the psychological factors were the most powerful variables for distinguishing between the groups. An interview with the participants indicated an additional important fact. Initially we suspected that one method of coping with the pain that might differ between the groups was that those working put their effort into work, but instead were inactive at home. Conversely, we suspected that those at home had a more active home and leisure life. To our astonishment, the results of the interview indicated the opposite! Those who were working reported a more active home and leisure life than those off work. This seemed to be related to the beliefs the participants held about the relationship between activity and pain.

In fact, we have now begun to understand that while pain, function and disability overlap somewhat, the strength of the relationship varies greatly. Clinically, it is well known that some patients may continue to work and function well even though they suffer intense pain, while others may have great difficulties functioning with moderate pain. Waddell (2002) examined the literature on this subject and showed that pain intensity has a relatively weak relationship with time off work. Further, he asserts that pain, disability and time off work are three related but distinct concepts. That is, while there is some overlap in who is experiencing pain, or functional problems, or work incapacity, there are many people suffering only one of these. Indeed, the correlation between pain severity and disability is relatively weak. This means that having pain does not necessarily equate
with functional problems or time off work. Pain is simply not the same as function!

**Implications**
There are two clear implications concerning the relationship between pain and function. First, we need to be very clear about terminology and the assumptions we have about these words. Pain is often used to mean pain intensity and this in turn is often assumed to be directly and strongly related to function. As noted above, pain has many qualities and is not the sole determiner of function. A second implication is that pain treatment may need to be oriented toward several variables in order to be effective. Traditionally, pain treatment has been focused on relieving the symptom. A sole measure has often been pain intensity ratings. However, the discussion here demonstrates that pain intensity may be addressed with little or no effect on function. Likewise, even if pain intensity cannot be influenced, treatment focused on other aspects such as function may have dramatic effects for the patient. Thus new roads for pain treatment may be opened.

**SUMMARY**
Pain has been an important experience throughout recorded history and various models of how pain functions have evolved. These continue to exert some influence in the way we view pain today. Pain may still have some moral overtones that date back to models where pain was equated with punishment. Perhaps the most influential model that continues to infiltrate is Descartes’s model where the body and mind are separated. Modern research, however, demonstrates that our pain system is highly integrated and involves biological as well as psychological aspects. Thus, the definition of pain underscores not only the role of tissue damage but the psychological experience as well. While the biological and psychological processes are highly integrated, the relationships are not necessarily simple ones. For example, the relationship between pain and function is not as straightforward as previously believed. Finally, the temporal aspects of pain are an important aspect of pain. How we experience pain changes with time as do the consequences for us.