Where Does It Hurt?
Understanding and Dealing with Pain

By Gail Gorman

An astounding 57.2 percent of adults in the United States report experiencing chronic or recurrent pain.1 Worse yet, nine out of ten Americans report that they regularly have some pain (monthly or more often),2 and more than two thirds of all full-time employees use sick time specifically as a result of pain-related illness.3

Chronic pain costs the public nearly $1 billion each year in health care, compensation, and litigation.4 The adult population of the United States is certainly hurting, but why? What can be done to make it better?

What Do We Mean by ‘Pain’?
We all know the sensation of pain at some point: a finger inadvertently slammed in the drawer, too much reading under too little light, or a broken heart. Life is filled with those pains, and if we were to conduct a survey at that level, the victim count would be virtually 100 percent. Everybody hurts... sometime.

Pain that is regular or deep and chronic, recurring, at least partially and, more often, wholly debilitating, affects one of every two adults in the United States.

At this level, there are dozens of differing classifications for pain, and there is much confusion as to how much pain hurts, there is little agreement as to how pain should be treated. Thus, for all but the most clearly defined classes of disease and injury-related pain, the treatment that patients receive depends on the talent of the practitioner and patients’ own ability to understand and advocate for themselves.

How Does Pain Occur?
No matter how it is classified, pain of all types has the same basic mechanism. It originates as the sensing of a noxious event, for example, burning heat, catastrophic tissue degeneration due to disease, a crushing or pressure injury, or a slash or cut injury. These sensations are converted into signals at the cellular level, often by complex interaction with a specific protein and specialized sensory neurons (nociceptors). These electrical impulses are sent along existing nerve pathways to the central nervous system (CNS), producing our experience of pain.

The CNS is a wondrously complex biochemical/electrical system that has as its important quality of plasticity. Plasticity refers to the ability of neurons to form, break, and re-form semi-persistent patterns that we then match against in response to sensory input. These patterns determine how we experience the world around us. We use them to form our experience of "reality."5

Patterning means that the same stimulus may lead to very different experiences based on changes in our neural patterns. It is this plasticity that facilitates the imprint of pain onto our senses, causing phenomena such as phantom pain (for example, the sensation from a missing limb) and chronic or recurring pain that persists long after the original injury has healed. Recurring and chronic pain is often as much a result of persistent patterns of pain as it is the result of actual continued physical insult or injury.5

Rebound Headaches From Pain Relievers

Many experts believe that rebound headaches are a result of the frequent and excessive use of short-acting, immediate-relief pain drugs. People who take these types of medications more than twice a week may find themselves taking them to calm the withdrawal symptoms of that same medication.

Many drugs can cause this spiral, including aspirin/acetaminophen/caffeine combinations, butalbital compounds (e.g., Fioricet®), and narcotics such as propoxyphene (e.g., Darvon®), codeine (e.g., Hydrocodone®; Hycodean®), oxycodone (e.g., OxyContin®), and morphine (e.g., Roxanol®). Nonsteroidal anti-inflammatory drugs such as ibuprofen (Voltaren®), naproxen (e.g., Naprosyn®), Asapro®), and ketoprofen (Orudis®) can cause rebound headaches. However, these drugs are less likely to do so, compared with the short-acting medications. (Source: National Headache Foundation, February, 2006.)

“He says he pulled a muscle during our mating dance, but that was six years ago.”

Knowing what we do now about patterning, experience, and the plastic quality of our senses, it is no longer useful to ask whether pain is “real” or imagined. All pain is processed the same way, regardless of whether there is an outside stimulus. Therefore, pain is real, and it is all “imagined” by the nervous system.

Even the nociceptors, those original sensors of noxious events, have plasticity. These primary sensors can develop patterns that will increase or decrease inhibitory mechanisms, resulting in heightened experience of pain from even common stimuli (or no stimuli at all). Of course, the opposite is also possible, resulting in a dulled experience of pain.6

Name the Pain
With all of this patterning and re-patterning going on, not to mention the rapid pace of discovery on the frontier of pain research, it is no wonder that there are no rules when it comes to defining pain. In general, however, pain is classified according to five basic categories: location, duration, frequency, intensity, and the underlying cause.7

Location. The location of pain leads to classifications such as neurologic, vascular, or musculoskeletal, each with a specific set of treatment possibilities. The more specific the location, the more specific the treatment options become. General sites such as the lower back, leg, or neck are less useful in our current method of treatment. General designations are more likely to be consigned to delayed treatment; as more specific information is needed, the pain might be treated with pain medications, or worse still, there may be no treatment at all.

Duration and Frequency. The duration and frequency help to qualify pain as acute (lasting 30 days or less), recurring acute pain, or chronic pain (persisting for more than six months). Subacute covers the time between the end of the first month and the beginning of month six, a crucial time for defining treatment strategy.

The primary distinction between acute and chronic pain is the purpose it serves. Acute pain is considered protective and useful. It warns us of injury or possible injury; it keeps us from using a wounded or diseased body part and causes us to limit dangerous activity. Without acute pain, it is doubtful that human survival would be possible at all.8

Chronic pain, on the other hand, takes over the patient’s life. It is usually debilitating, causing depression and ultimately lowering quality of life. Subacute pain, that murky area in between two classifications, is the source of most pain problems. The proper classification of pain leads directly to treatment strategy. Acute pain can be treated with intervention, but chronic pain must be treated with management strategies and rehabilitation.

When pain is subacute, it becomes unclear as to which treatment type would yield the best results. Acute pain, when improperly handled, can turn chronic. Chronic pain treated with acute methodologies, most notably pain relief medication, can lead to chemical dependence.

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Are Alternative Headache Therapies Right for You?

Although mainstream medicine can be an effective option for America's 45 million patients with headaches, an increasing number of these individuals are exploring alternative therapy options. According to a survey conducted by the National Headache Foundation, 58 percent of patients have tried an alternative therapy. Of the survey respondents, 55 percent began using alternative treatments because they felt that their medications were not effective, and 49 percent were concerned about side effects of their medication. Some of the more popular alternative therapies used by the respondents included the following.

Practitioner-based
Massage: Good for general relaxation and to relieve stress buildup in the muscle tissue. Studies suggest that massage can decrease headache frequency and increase body awareness. Personal preference is the best way to choose which type of massage. (tried by 69 percent of respondents)

Acupuncture and acupressure: These ancient treatments for pain relief appear to work by stimulating the release of endorphins, the body's natural pain-killing substance. Relief from both pain and nausea, a decrease in the frequency of migraine, and a reduced need for medication have resulted from these methods. (tried by 41 percent of respondents)

Dietary Supplements
Magnesium: This mineral has a relaxant effect on smooth muscle, such as in blood vessels. Patients with frequent or daily headaches usually have low magnesium levels. Daily supplementation of 500 to 750 milligrams (mg.) increases the body's magnesium level. This mineral has shown a preventive benefit in menstruation-related migraine. (tried by 43 percent of survey respondents)

Riboflavin (vitamin B2): This vitamin assists nerve cells in the production of adenosine triphosphate, an energy-producing substance, and it is essential for many chemical reactions in the body. High doses of riboflavin (400 mg.) can reverse "energy crises" in cells during migraine attacks and can decrease the intensity of pain. (tried by 45 percent of respondents)

Cherries and Other Red Fruit
May Be Better Than Aspirin

New research suggests that cherries and other red and burgundy-colored fruits can limit pain after exercise and can speed the repair of muscle tears. The new studies are the most recent in a long list of research pioneered at Michigan State University almost 15 years ago. In 1999, data showed that eating approximately 20 cherries each day was a natural way of providing the anti-inflammation effects of aspirin.

After reviewing the results further, the cherries were found to be ten times as potent as aspirin for inhibition of cyclooxygenase 1 and 2 (COX-1 and COX-2) enzymes, which cause inflammation. The effects of the cherries also lasted longer than those of aspirin.

Because fresh cherries are not available everywhere, research turned toward cherry juice and its possible effects on pain relief. A group at the University of Vermont gave apple-cherry juice to a group of 14 college men for a week on two separate occasions.

One of the phases of the test involved two 12-ounce servings of apple juice mixed with cherry juice. Each drink contained the equivalent of about 50 cherries. During another phase, the participants drank apple drinks with a synthetic cherry flavoring.

During each phase, each participant did 40 bicep curls with a weight heavy enough to damage the muscles. Participants used a scale to rate their pain in the days following the exercise. The average pain felt after drinking the synthetic cherry drink was 3.2. After they drank the authentic cherry drink, the average pain rating dropped to 2.4. The pain following the real cherry drink peaked at 24 hours after the exercise and at 48 hours following the exercise.

Other foods with red-to-blue-black pigments have similar effects, perhaps a result of the high level of antioxidants present in those foods.

To Avoid Acetaminophen Can Damage The Liver

Acetaminophen is the main ingredient in pain relievers such as Tylenol® and Excedrin®, many popular sleep aids and headache remedies, the-counter cold and flu remedies, such as Nyquil® Sudafed® or Theraflu®. It is also found in some prescription painkillers.

"It is easy to lose track of how much combined acetaminophen you're consuming when taking combinations of medicines, particularly for different ailments, such as arthritis and perhaps a cold," says Dr. William Lee, Director of the Clinical Center for Liver Diseases at the University of Texas Southwestern Medical Center-at Dallas.

Too much acetaminophen in the system at one time or over an extended period can cause serious liver damage or lead to liver failure and even death. About 100 people die annually of accidental acetaminophen poisoning, and another 15,000 are seen in hospital emergency rooms as a result of unknowingly taking too much.

Avoid taking more than 4,000 milligrams (mg.) combined a day. People with liver problems (such as hepatitis) and those who drink alcohol regularly should take no more than 2,000 to 3,000 mg. Alcohol makes acetaminophen more toxic while it depletes other substances that protect against liver damage.

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Although it is impossible to estimate how many people in the United States have become dependent on pain-relief medications prescribed initially for legitimate purposes, we do know that a chilling 4.7 million Americans used prescription drugs for a nonmedical purpose for the first time in 2002. The use of painkillers increased from 573,000 persons in 1990 to 2.5 million new users in 2000.

Sadly, although people 65 years of age or older account for only 13 percent of the overall population, they account for 33 percent of the prescription drug users. Perhaps the most frightening truth about prescription pain relief medications is that the body adapts to the drugs, and we require more medication as time goes on just to obtain the same relief. The consequence of mishandling the treatment strategy for pain is serious and is aimed at those patients who depend most on the ability of health care professionals to treat them with care.

Pain Intensity
The intensity of pain has a direct impact on treatment decisions. Most people consider a certain level of pain just a natural part of life, and they opt to use over-the-counter products. There are two basic types of nonprescription pain agents: acetaminophen (e.g., Tylenol®) and nonsteroidal anti-inflammatory drugs (NSAIDs).

Acetaminophen works by elevating the amount of pain we can tolerate before we experience the feeling of pain. NSAIDs work by reducing pain, swelling, stiffness and inflammation; they include aspirin, ibuprofen, ketoprofen, and naproxen (Aleve®). Each of these drugs has potential significantly adverse effects, and the risk goes up with the regularity of use. Yet according to a 2002 study in the Journal of the American Medical Association, nearly 80 percent of American adults reported taking over-the-counter pain relievers at least once a week.

For more intense pain, there are drugs with more intense actions. The most commonly prescribed drugs of this type are opioids. They are strong medicines, strictly controlled, and widely misused. Among them are propoxyphene (Darvon®), meperidine (Demerol®), Dilaudid, oxycodone (OxyContin®), Tylenol® with Codeine, oxycodone/acetaminophen (Percocet®), and hydrocodone/acetaminophen (Vicodin®).

Other pain relief drugs, often an antidep欣ent such as flunoxetine (Prozac®) or a monoamine oxidase (MAO) inhibitor is prescribed. In one five teenagers has admitted to abusing a prescription pain medication (imagine what the statistic might be if we could include those who can't admit it). Each of these drugs has potentially significantly adverse effects, and the risk goes up with the regularity of use. Yet according to a 2002 study in the Journal of the American Medical Association, nearly 80 percent of American adults reported taking over-the-counter pain relievers at least once a week.

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Other pain relief drugs, often an antidepressant such as fluoxetine (Prozac®) or a monoamine oxidase (MAO) inhibitor is prescribed. In one five teenagers has admitted to abusing a prescription pain medication (imagine what the statistic might be if we could include those who can't admit it). Each of these drugs has potentially significantly adverse effects, and the risk goes up with the regularity of use. Yet according to a 2002 study in the Journal of the American Medical Association, nearly 80 percent of American adults reported taking over-the-counter pain relievers at least once a week.

The Cause of Pain
How did all of this get started? The underlying cause of pain is, of course, the best indicator for treatment options. Unfortunately, the cause of pain is an ever-changing subject among researchers today, and for good reason. We are just beginning to understand the ever-adaptive nature of the nervous system. The impact of our new knowledge on how we define pain is monumental.

Of interest to us at this point is nonmalignant chronic pain (long-term pain that is not caused by cancer or by cancer treatments). Nonmalignant pain starts from a variety of sources such as:
Cognitive Decline Following Stroke Linked to Pain

A study conducted at Lund University in Sweden found that a significantly large group of people with cognitive decline after a stroke felt less pain later on than patients with no cognitive damage after the stroke.

Researchers evaluated 416 patients who had their first stroke during a one-year period and conducted follow-ups after the fourth and 16th months. Pain intensity was tracked for 48 hours and was assessed on a scale of 1 to 100.

At the 16-month follow-up, the investigators screened the patients using the Geriatric Depression Scale, and they measured cognitive abilities using the Mini-Mental State Examination (MMSE).

More than 80 percent of the patients reported moderate to severe pain after four months. After 16 months, the number of patients reporting pain dropped to 21 percent. Women were more likely to experience higher pain intensity than men.

To assess where the most pain was located in these patients, the researchers registered variables for age, sex, the main type of stroke, the National Institutes of Health (NIH) stroke scale, sensory disturbance, hypertension, cardiac disease, and diabetes mellitus. Glucose metabolism impairment has been associated with joint mobility problems and shoulder impairment in previous studies. The researchers also questioned the patients about their mobility prior to the stroke and asked them to gauge the severity of ambulatory decline (the inability to walk).

At both follow-up meetings, the team assessed the patients' status by dividing the results into three categories: independent, moderate dependence, and major dependence. Cognitive function was measured at the second follow-up as well.

At the first follow-up, 98 percent of the study participants were considered independent. At the second follow-up, 34 percent of the patients with no or mild pain and 57 percent of the patients who experienced moderate to severe pain were found to have very little cognitive impairment.

For patients with moderate to severe pain, the location and cause of the pain changed over time. At the first follow-up, more than half of the causes of pain were stroke-related, and about 40 percent were the results of other causes. About 75 percent of patients who reported upper-body pain experienced pain in their shoulder. At the second follow-up, only half that number of patients had upper-body pain, and only 68 percent of that number reported pain in the shoulder.

Patients who reported moderate to severe pain at the first follow-up visit experienced considerable improvement in both the upper and lower limbs.

The study also showed that about half of the patients who reported moderate to severe pain almost immediately following the stroke had no pain at the second follow-up.

The number of patients who experienced cognitive decline following the stroke was significantly larger in the group who experienced no or only mild pain at the second follow-up. The reason is not known, but it is thought that the patients with impaired cognitive skills might have been less physically active and therefore did not move enough to cause pain.

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- arthritis
- neuropathy or neuralgia
- back pain from injury or a chronic disorder
- headache
- abdominal pain from chronic pancreatitis or bowel disorders
- pelvic pain
- diffuse conditions (fibromyalgia, reflex sympathetic dystrophy, lupus)
- systemic autoimmune or connective-tissue conditions (multiple sclerosis)
- neuromuscular conditions, including any acute pain from insult or injury that subsequently becomes chronic

These are only a sample of potential sources of chronic pain. The best research to date tells us that this persistent sort of chronic pain is often at least augmented by, and sometimes even the result of, our nervous system’s ability to “learn to hurt.” We are discovering that the plasticity of the nervous system develops patterns of pain that become entrenched and then fire at the slightest provocation. Even when there is an underlying cause of chronic pain, the nervous system can adapt to overcome the effect of a medication (which is why people need a greater dose to get the same relief) and to entrench further the pattern of pain.

In extreme cases, we see severe pain in limbs that have been amputated, chronic debilitating pain from an injury that has long since healed, hyperalgesia (a significantly lowered pain threshold), and allodynia (the perception of pain caused by usually nonpainful stimuli such as touch or vibration). 14

Two unfortunate examples of nervous system plasticity are fibromyalgia and chronic fatigue syndrome.

Fibromyalgia is a chronic illness characterized by pain, fatigue, and poor-quality sleep. Initially, it was believed to be a musculoskeletal disorder because that was where patients seemed to experience much of the pain. 15

Chronic fatigue syndrome comprises a group of symptoms characterized by unexplained fatigue, weakness, muscle pain, feeling poorly, trouble thinking, and sometimes fever and/or lymph node swelling.

Research now suggests that these are more likely to be disorders of nervous system plasticity causing central sensitization and pain amplification. Initially lumped in with other autoimmune disorders (caused by an immune response against the body’s own tissues), such as Graves’ disease, Hashimoto’s disease, multiple sclerosis, rheumatoid arthritis, and lupus, these diseases are just now coming into their own, newly earning medical and scientific attention.

Historically, fibromyalgia and chronic fatigue syndrome have been so
"I want to take a year before college to get chiropractic treatment, Dad."

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mysterious to conventional medicine that we are not yet certain of how extensive the problem is. Estimates range from one-half million to as many as 10 million Americans.17

To be fair, chronic pain from any source and its management are not well understood. On February 12, 2002, representatives of the American Pain Foundation testified before the Senate Health, Education, Labor, and Pensions Committee that although most pain can be managed, it often goes untreated, improperly treated, or undertreated.

If I Have Learned to Hurt, Can I Un-learn It?

Given the newly discovered plastic nature of the nervous system and the growing knowledge about pain and its management, we can have hope for the future. Generally, the best physicians agree that treating chronic pain requires a multidisciplinary team that might include a combination of physiotherapists, psychologists, counselors, and pain specialists. Even though pain medicine does provide relief, simply tossing a prescription at the problem too often leads to drug tolerance and chemical dependence long before the patient is relieved of pain. The same problem holds true for the use of antidepressant agents. Without some way to retrain the nervous system, we run the risk of slapping a bandage over it without addressing the root cause. This is not a workable long-term strategy.

Some leading-edge researchers and medical professionals are already taking steps. Stanford University researchers report that showing brain scans to people and using mental exercises helped reduce pain in patients in England.18 Researchers in Edinburgh discovered that "chemicals that prompt the feelings of coolness had a dramatic painkiller effect."19

In the U.S., researchers tested the effects of music on patients with chronic pain. In a study of 60 patients, those who listened to music reported a reduction in pain levels of up to 21 percent and a drop in associated depression of up to 25 percent. Listening to music also helped people to "feel less disabled."20

A Wake Forest University study showed that positive thinking was as powerful as a shot of morphine for relieving pain and reducing activity in the parts of the brain that process pain.21

What Does All This Mean for My Migraine?

Unfortunately, the optimal treatment of pain is still inconclusive, and fortunately, the research is verifiable. As such, readers of Nutrition Health Review can discuss various treatment options with their health care practitioners. With so much information virtually at our fingertips, we can look for a better way to handle our pain.

We must all do our own research, understand what is known, and become our own best advocate. Now the next time your doctor asks you, "Where does it hurt?", you can say:

"Well, you see, we have these nociceptors that have a pathway up the spinal column through the central nervous system and into the brain. Have you heard of plasticity?"

References


2. American Pain Foundation, quoting: Pain in America, a 1999 survey developed for Merck by Ogilvy and conducted by the Gallup Organization.


Autism Linked to Increased Pain

It is thought that humans are equipped to limit the amount of stimuli entering the brain to prevent overload. This is known as the "normal" range of feeling.

People with autistic spectrum disorder, or Asperger’s syndrome, are known to be hypersensitive to stimuli and disruptions in their sensory processing, which can lead to an unequal reaction to certain types of pain.

An elevated level of dopamine beta hydroxylase (DBH), an enzyme involved in cell communication, is present in those with Asperger’s syndrome. An abundance of DBH has been linked to repetitive behaviors, agitation, and aggression.

Even though children with autism have a much lower tolerance for pain, certain repetitious activities such as rocking, arm flapping, or pacing result in an increased level of released endorphins, which can reduce the sensation of pain in the body. The build-up of endorphins in the brain may explain why children with Asperger’s syndrome who have physical accidents report feeling less pain when the accidents occur in the afternoon or evening.
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