



The following excerpt has been taken from the Christopher & Dana Reeve Foundation Paralysis Resource Center website.

<http://www.christopherreeve.org/site/c.mtKZKGMWKwG/b.4453423/k.B38D/Pain.htm>

## **Pain**

Pain is a normal sensation triggered in the nervous system to alert you to possible injury and the need to take care of yourself. **Acute pain** usually results from sudden disease, inflammation, or injury to tissues. The cause of acute pain can usually be diagnosed and treated, and the pain confined to a given period of time and severity.

**Chronic pain** doesn't go away – it persists over a longer period of time than acute pain and is resistant to most medical treatments. Pain signals keep firing in the nervous system for weeks, months, even years, after an initial painful mishap. There may be an ongoing cause of pain -- arthritis, cancer, ear infection, etc. -- but some people suffer chronic pain in the absence of any past injury or evidence of body damage. Chronic pain, ironically, often accompanies paralysis.

Pain is a complex perception that differs enormously among individuals, even those who appear to have identical injuries or illnesses. People who are paralyzed often have what is called neurogenic pain (resulting from damage to nerves in the body or to the spinal cord or brain itself). Treatment options for chronic pain include medications, acupuncture, local electrical stimulation, brain stimulation and surgery. Psychotherapy, relaxation and medication therapies, biofeedback, and behavior modification may also be employed.

The goal of pain management is to improve function, enabling individuals to work, attend school, or participate in other day-to-day activities. The following are among the most common treatments:

**Acupuncture** dates back 2,500 years to China and involves the application of needles to precise points on the body. Acupuncture remains controversial but is quite popular and may one day prove to be useful for a variety of conditions as it continues to be explored.

**Analgesic** refers to the class of drugs that includes most painkillers, such as aspirin, acetaminophen, and ibuprofen. Nonprescription or over-the-counter pain relievers are generally used for mild to moderate pain.

**Anticonvulsants** are used for the treatment of seizure disorders but are also sometimes prescribed for the treatment of pain. Carbamazepine in particular is used to treat a number of painful conditions, including trigeminal neuralgia. Another antiepileptic drug, gabapentin, is being studied for its pain-relieving properties, especially as a treatment for neuropathic pain.

**Antidepressants** are sometimes used for the treatment of pain. In addition, anti-anxiety drugs called benzodiazepines also act as muscle relaxants and are sometimes used as pain relievers.

**Biofeedback** is used for the treatment of many common pain problems. Using a special electronic machine, the patient is trained to become aware of, to follow, and to gain control over certain bodily functions, including muscle tension, heart rate, and skin temperature. The individual can then learn to effect a change in his or her responses to pain, for example, by using relaxation techniques.

**Capsaicin** is a chemical found in chili peppers that is also a primary ingredient in pain-relieving creams.

**Chiropractic** refers to hand manipulation of the spine, usually for relief of back pain. It has never been without controversy. Chiropractic's usefulness as a treatment for back pain is, for the most part, restricted to a select group of individuals with uncomplicated acute low back pain who may derive relief from the massage component of the therapy.

**Cognitive-behavioral therapy** involves a wide variety of coping skills and relaxation methods to help prepare for and cope with pain.

**Counseling** can give a patient suffering from pain much needed support, whether it is derived from family, group, or individual counseling. Support groups can provide an important adjunct to drug or surgical treatment.

**COX-2 inhibitors ("superaspirins")** Nonsteroidal anti-inflammatory drugs (NSAIDs) work by blocking two enzymes, cyclooxygenase-1 and cyclooxygenase-2, both of which promote production of hormones called prostaglandins, which in turn cause inflammation, fever, and pain. Newer drugs, called COX-2 inhibitors, primarily block cyclooxygenase-2 and are less likely to have the gastrointestinal side effects sometimes produced by NSAIDs. In 1999, the Food and Drug Administration approved two COX-2 inhibitors-rofecoxib (Vioxx) and celecoxib (Celebrex). On 9/30/04 Merck & Co. Inc. voluntarily withdrew Vioxx from the market. Further information about the Vioxx withdrawal may be found at <http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm103420.htm>

**Electrical stimulation**, including transcutaneous electrical stimulation (TENS), implanted electric nerve stimulation, and deep brain or spinal cord stimulation, is the modern-day extension of age-old practices in which the nerves of muscles are subjected to a variety of stimuli, including heat or massage. Electrical stimulation is not for everyone, nor is it 100 percent effective. The following techniques each require specialized equipment and personnel trained in the specific procedure being used:

- **TENS** uses tiny electrical pulses, delivered through the skin to nerve fibers, to cause changes in muscles, such as numbness or contractions. This in turn produces temporary pain relief.
- **Spinal cord stimulation** uses electrodes surgically inserted within the epidural space of the spinal cord. The patient is able to deliver a pulse of electricity to the spinal cord using a small box-like receiver and an antenna taped to the skin.
- **Deep brain stimulation** is considered an extreme treatment and involves surgical stimulation of the brain, usually the thalamus. It is used for a limited number of conditions, including severe pain, central pain syndrome, cancer pain, phantom limb pain, and other neuropathic pains.

**Exercise:** Because there is a known link between many types of chronic pain and tense, weak muscles, exercise -- even light to moderate walking or swimming -- can contribute to an overall sense of well being by improving blood and oxygen flow to muscles. Just as we know that stress contributes to pain, we also know that exercise, sleep, and relaxation can all help reduce stress, thereby helping to alleviate pain.

**Hypnosis**, first approved for medical use in 1958, continues to grow in popularity, especially as an adjunct to pain medication. In general, hypnosis is used to control physical function or response, that is, the amount of pain an individual can withstand. Hypnosis may result in relief of pain by acting on chemicals in the nervous system, slowing impulses.

**Low-power lasers** have been used occasionally by some physical therapists as a treatment for pain, but like many other treatments, this method is not without controversy.

**Magnets:** Usually worn as a collar or wristwatch, the use of magnets as a treatment dates back to the ancient Egyptians and Greeks. While it is often dismissed as quackery and pseudoscience by skeptics, proponents offer the theory that magnets may effect changes in cells or body chemistry, thus producing pain relief.

**Nerve blocks** employ the use of drugs, chemical agents, or surgical techniques to interrupt the relay of pain messages between specific areas of the body and the brain. Types of surgical nerve blocks include neurectomy; spinal dorsal, cranial, and trigeminal rhizotomy; and sympathectomy, also called sympathetic blockade.

**Nonsteroidal anti-inflammatory drugs (NSAIDs)** (including aspirin and ibuprofen) are widely prescribed and sometimes called non-narcotic or non-opioid analgesics. They work by reducing inflammatory responses in tissues. Many of these drugs irritate the stomach and for that reason are usually taken with food.

**Opioids** are derived from the poppy plant and are among the oldest drugs known to humankind. They include codeine and perhaps the most well known narcotic of all, morphine. Morphine can be administered in a variety of forms, including a pump for patient self-administration. Opioids have a narcotic effect, that is, they induce sedation as well as pain relief, and some patients may become physically dependent upon them. For these reasons, patients given opioids should be monitored carefully; in some cases stimulants may be prescribed to counteract the sedative side

effects. In addition to drowsiness, other common side effects include constipation, nausea, and vomiting.

**Physical therapy and rehabilitation** date back to the ancient practice of using physical techniques and methods, such as heat, cold, exercise, massage, and manipulation, in the treatment of certain conditions. These may be applied to increase function, control pain, and speed the patient toward full recovery.

**Surgery:** Operations for pain include rhizotomy, in which a nerve close to the spinal cord is cut, and cordotomy, where bundles of nerves within the spinal cord are severed. Cordotomy is generally used only for the pain of terminal cancer that does not respond to other therapies. Another operation for pain is the dorsal root entry zone operation, or DREZ, in which spinal neurons corresponding to the patient's pain are destroyed surgically. Occasionally, surgery is carried out with electrodes that selectively damage neurons in a targeted area of the brain. These procedures rarely result in long-term pain relief, but both physician and patient may decide that the surgical procedure will be effective enough that it justifies the expense and risk.

## **Research**

Scientists believe that advances in neuroscience will lead to more and better treatments for chronic pain in the years to come.

Clinical investigators have tested chronic pain patients and found that they often have lower-than-normal levels of endorphins in their spinal fluid. Investigations of acupuncture include wiring the needles to stimulate nerve endings electrically (electroacupuncture), which some researchers believe activates endorphin systems. Other experiments with acupuncture have shown that there are higher levels of endorphins in cerebrospinal fluid following acupuncture. Investigators are studying the effect of stress on the experience of chronic pain. Chemists are synthesizing new analgesics and discovering painkilling virtues in drugs not normally prescribed for pain.

In the forefront of pain research are scientists supported by the National Institutes of Health (NIH), including the NINDS. Other institutes at NIH that support pain research include the National Institute of Dental and Craniofacial Research, the National Cancer Institute, the National Institute of Nursing Research, the National Institute on Drug Abuse, and the National Institute of Mental Health.

Some pain medications dull the patient's perception of pain. Morphine is one such drug. It works through the body's natural pain-killing machinery, preventing pain messages from reaching the brain. Scientists are working toward the development of a morphine-like drug that will have the pain-deadening qualities of morphine but without the drug's negative side effects, such as sedation and the potential for addiction. Patients receiving morphine also face the problem of morphine tolerance, meaning that over time they require higher doses of the drug to achieve the same pain relief. Studies have identified factors that contribute to the development of tolerance; continued progress in this line of research should eventually allow patients to take lower doses of morphine.

Blocking or interrupting pain signals, especially when there is no injury or trauma to tissue, is an important goal in the development of pain medications. An increased understanding of the basic mechanisms of pain will have profound implications for the development of future medicines.

Source: National Institute of Neurological Disorders and Stroke (NINDS)

### Web Sites

[www.theacpa.org](http://www.theacpa.org)

#### **American Chronic Pain Association (ACPA)**

The American Chronic Pain Association (ACPA) facilitates peer support and education for individuals with chronic pain and their families so that these individuals may live more fully in spite of their pain.

[www.aapainmanage.org](http://www.aapainmanage.org)

#### **American Academy of Pain Management (AAPM)**

The American Academy of Pain Management (AAPM) is the largest multidisciplinary pain society and largest physician-based pain society in the United States. The Academy is a nonprofit multidisciplinary credentialing society providing credentialing to practitioners in the area of pain management. The Academy holds full voting membership in the National Organization of Competency Assurance.

[aapm@aapainmanage.org](mailto:aapm@aapainmanage.org)

13947 Mono Way #A

Sonoma, CA 95370

(209) 533-9744

<http://www.painfoundation.org/>

#### **American Pain Foundation**

Assists people through information, advocacy and support.

[www.ampainsoc.org](http://www.ampainsoc.org)

#### **American Pain Society**

The American Pain Society is a multidisciplinary organization of basic and clinical scientists, practicing clinicians, policy analysts, and others. The mission of the American Pain Society is to advance pain-related research, education, treatment and professional practice. APS has clinical excellence awards in which it names 6 centers as top award winners.

<http://www.ampainsoc.org/awards/ccoe/index.htm>

<http://centralpain.org/>

#### **Central Pain Syndrome Alliance**

<http://www.painonline.org/index.htm>

#### **Central Pain Syndrome Information Resource**

Includes info for patients and doctors, a discussion forum, and a glossary.

[www.chronicbabe.com](http://www.chronicbabe.com)

**Chronic Babe** is for young women living with chronic pain. It offers a forum and newsletter.

<http://www.chronicpaincanada.com/>

**Chronic Pain Association of Canada** is a Canadian association of self-help groups dedicated to providing support to people in chronic pain.

<http://sci.rutgers.edu/>

### **Care Cure Community**

Their forums provide information on spinal cord injury care, caregiving, cure, funding, life, pain, sex, links, research, and trials. Visit [carecure.rutgers.edu/spinewire](http://carecure.rutgers.edu/spinewire) to read articles about spinal cord injury.

[www.craighospital.org/SCI/METS/achingShoulders.asp](http://www.craighospital.org/SCI/METS/achingShoulders.asp)

### **Craig Hospital's article on Aching Shoulders**

This site, run by Craig Hospital, asks -- and answers -- all the important questions about shoulder pain. From the home page, click on Spinal Cord Injury, then Health and Wellness. See Educational Brochures.

<http://www.craighospital.org/SCI/METS/upperExtremity.asp>

### **Craig Hospital's article on Upper Extremity Pain**

### **Defense & Veterans Pain Management Initiative**

<http://www.arapmi.org/>

The organizational objective is expanded to ensure that pain management services are available at all military treatment facilities, those in-theatre, in Germany and throughout the continental United States.

<http://www.disaboom.com/Health/Chronic-Pain.aspx>

### **Disaboom: Pain**

[www.iasp-pain.org](http://www.iasp-pain.org)

### **International Association for the Study of Pain**

They are the largest multidisciplinary international association in the field of pain. Founded in 1973, IASP is a non-profit professional organization dedicated to furthering research on pain and improving the care of patients with pain. Membership in IASP is open to scientists, physicians, dentists, psychologists, nurses, physical therapists, and other health professionals actively engaged in pain research and to those who have special interest in the diagnosis and treatment of pain.

[www.medtronic.com](http://www.medtronic.com)

### **Medtronic**

Medtronic is the world leader in medical technology providing lifelong solutions for people with chronic disease. Medtronic is a medical technology company, which provides therapeutic,

diagnostic, and monitoring products for the cardiac rhythm management, other cardiovascular, and neurological markets.

<http://www.paincare.org/>

**National Foundation for the Treatment of Pain**

The National Foundation for the Treatment of Pain is a not-for-profit organization providing support for people with intractable pain, their families, friends and the physicians who treat them.

[www.ninds.nih.gov/disorders/chronic\\_pain/chronic\\_pain.htm](http://www.ninds.nih.gov/disorders/chronic_pain/chronic_pain.htm)

**National Institute of Neurological Disorders and Stroke: Chronic Pain Information Page**

[www.nationalpainfoundation.org](http://www.nationalpainfoundation.org)

**National Pain Foundation**

[http://www.ncpad.org/disability/fact\\_sheet.php?sheet=325](http://www.ncpad.org/disability/fact_sheet.php?sheet=325)

**NCPAD's Primer on Pain**

[www.pain-connection.org](http://www.pain-connection.org)

**Pain Connection: Chronic Pain Outreach Center**

A non-profit which provides monthly support groups in the Maryland area, information, referrals, and community outreach as well as a newsletter called Pain Connection.

[www.pain-topics.org](http://www.pain-topics.org)

**Pain Treatment Topics**

[www.partnersagainstpain.com](http://www.partnersagainstpain.com)

**Partners Against Pain: Purdue Pharma**

[www.spinalcord.uab.edu/show.asp?durki=21605](http://www.spinalcord.uab.edu/show.asp?durki=21605)

**University of Alabama at Birmingham's Pain Resources**

The Spinal Cord Injury Information Center features information on chronic pain and all other medical aspects of SCI paralysis.

<http://www.spinalcord.uab.edu/show.asp?durki=41119>

**University of Alabama at Birmingham's Info Sheet # 10 Pain After Spinal Cord Injury**

<http://images.main.uab.edu/spinalcord/pdffiles/Aug2002.pdf>

**University of Alabama at Birmingham's** newsletter Pushin' On Summer 2002 is devoted to pain issues. Readable online with Adobe.

<http://www.spinalcord.uab.edu/show.asp?durki=39091>

**University of Alabama at Birmingham's** newsletter Research Review Spring 2001 **"Pain After a Spinal Cord Injury"**

<http://aahd.webchoices.us/page.php?pname=publications/newsletters/2004/summer/healthBuzz>

**American Association on Health and Disability's** Health and Disability News, Summer 2004 article "Chronic Pain: An Emerging Public Health Issue"

[www.paintrials.org](http://www.paintrials.org)

**Brigham and Women's Hospital: Translational Pain Research**

Boston, MA

Phone: 617-525-7246

*If you would like to take an **alternative medicine** approach, visit these sites:*

<http://nccam.nih.gov/health/>

**National Center for Complementary and Alternative Medicine Information**

[www.healingtherapies.info](http://www.healingtherapies.info)

**Alternative Therapies for Physical Disability**

[www.mypainmanager.com](http://www.mypainmanager.com)

Garments for pain management

### **Articles**

[http://sci.washington.edu/info/pamphlets/pain\\_sci.asp](http://sci.washington.edu/info/pamphlets/pain_sci.asp)

University of Washington's article "Pain and Spinal Cord Injury"

[http://sci.washington.edu/info/forums/reports/pain\\_2010.asp](http://sci.washington.edu/info/forums/reports/pain_2010.asp)

University of Washington's report and streaming video on "Multidisciplinary Management of Pain in Spinal Cord Injury: An Approach to Improve Pain, Function and Psychological Coping"

### **Chat Rooms**

<http://neurotalk.psychcentral.com>

**NeuroTalk Communities—Chronic Pain**

[http://health.groups.yahoo.com/group/CPS\\_ALLIANCE/](http://health.groups.yahoo.com/group/CPS_ALLIANCE/)

**Yahoo Chat Group for Central Pain Syndrome**

The following books and videos are available for free loan from the PRC library. For more information, please see [www.paralysis.org](http://www.paralysis.org) and click the Lending Library tab.

## Books

- **Bonica's Management of Pain.** Edited by Scott M. Fishman, Jane C. Ballantyne, James P. Rathmell. New York: Wolters Kluwer/Lippincott Williams & Wilkins, 2010. 4<sup>th</sup> ed. REFERENCE Book—can't be borrowed.
- **Central Pain Syndrome: Pathophysiology, Diagnosis and Management.** Cambridge: Cambridge University Press, 2007.
- Gould, Harry J. III. **Understanding Pain: What It Is, Why it Happens, and How It's Managed.** St. Paul, Minn.: AAN Enterprises, 2006. American Academy of Neurology Press Quality of Life Guide for Patients and Families.
- Herman, Gwenn and Mary French. **Making the Invisible Visible: Chronic Pain Manual for Health Care Providers.** Potomac, MD: Pain Connection, 2009.
- **Mayo Clinic on Chronic Pain.** Rochester, MN: Mayo Clinic, 2002. 2<sup>nd</sup> ed.
- Monga, Trilok N., M.D. and Martin Grabois, M.D. **Pain Management in Rehabilitation.** New York, NY: Demos Medical Publishing, 2002. Includes chapters on pain in spinal cord injury, stroke, traumatic brain injury, multiple sclerosis, and polio.
- Silver, Julie K. **Chronic Pain And The Family: A New Guide.** Cambridge, MA: Harvard University Press, 2004.
- **Spinal Network: The Total Wheelchair Resource Book.** Horsham, PA: No Limits Communications, 2002. See Chapter 2 p. 90-99 Chronic Pain
- Thernstrom, Melanie. **The Pain Chronicles: Cures, Myths, Mysteries, Prayers, Diaries, Brain Scans, Healing, and the Science of Suffering.** New York: Farrar, Straux and Giroux, 2010.
- **Wall and Melzack's Textbook of Pain.** 5<sup>th</sup> ed. New York: Elsevier Churchill Livingstone, 2006.
- Willhoff, Jude. **Living Well With Chronic Pain.** Parker, CO: Thornton Publishing, 2004.
- Yeziarski, Robert P. and Kim J. Burchiel (editors). **Spinal Cord Injury Pain: Assessment, Mechanisms, Management.** Progress in Pain Research and Management Vol. 23. Seattle, Wash.: International Association for the Study of Pain, 2002.

- Zejdlik, Cynthia Perry. **Management of Spinal Cord Injury**. Boston: Jones and Bartlett Publishers, 1992.  
See Chapter 28 “Managing Pain”.

### Videos

- **Joe’s Story: Fighting Pain**. Princeton, NJ: Films for the Humanities and Sciences. DVD or VHS.
- **Living with Chronic Pain**. Information Television Network, 2006. DVD Healthy Body, Healthy Mind TV series.
- **Pain Management**. Information Television Network, 2006. DVD Healthy Body, Healthy Mind TV series.
- <http://www.spinalcord.uab.edu/show.asp?durki=97417>  
**University of Alabama at Birmingham’s streaming video on Pain Management (34 minutes).**

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