pain

Revealing the science behind how we perceive, manage and treat pain
by Drex Earle Ph.D.

pain

One pill. Two pills. Red pill. Blue pill.

Numerous options abound for a singular problem — pain, and you’re in the thick of it. Most of us have been there. Seemingly at the height of our mental and physical commitment, the body fails and pain begins to set in. Maybe it surfaces during the last half mile, or the aftershock that evening. Perhaps it strikes in the middle of a light workout or during an otherwise blissful slumber. Whether you’re a seasoned athlete or just starting off, pain is a major hindrance to health and fitness goals. Thankfully, several pain management options exist, ranging from physical rehabilitation to alternative medicine. And should you find yourself puzzled by pain, desperate for respite or baffled in the drug aisle, one of the most daunting challenges can be making an educated choice. Not all pain therapies are created equal, and not surprisingly there’s as much variability in the remedies as in pain itself. So what exactly can you find over-the-counter, in your home or at the doctor’s office that’s really appropriate for you? Here, we take a closer look at the phenomenon of pain, how to manage it, and if you’re in the thick of it, how to treat it.
Pain Personified

Pain is a part of life and whether it’s physical, mental or emotional, we often don’t see it coming despite the indelible impression it leaves. Having the power to humble, haunt and knock us to the sidelines, pain has a unique way of eluding explanation — we’ve all felt it and we’ll all feel it again, but that’s where the guarantees stop. In spite of our understandable distaste for it, pain serves as a key element of survival, a driving force in our evolution as a species.

When many of us think of pain, we imagine the stinging sensation of a hot stove, the aching pressure of a hangover or the emotional torment of unrequited love. Pain can actually be a friend when we encounter situations and people who might otherwise harm us. It can signal that physical injury is imminent, such as the ache from a soon-to-be-broken bone, or it can promote the healing process, alarming us of future discomfort.

Chronic pain, on the other hand, is often pathological rather than beneficial, an argument for some that it may not have much evolutionary benefit. Affecting more than one in six Americans today, chronic pain is virtually synonymous with the aging process, yet it manifests itself in many forms, most commonly as inflammatory ailments like back pain, arthritis or fibromyalgia.

“The most common sources of pain are low levels of hormones related to aging and ‘stress’ hormones caused by stressful events,” says Mike Clark, clinical director of Natural Bio Health in Austin. “As we age, our hormones decline, resulting in general aches and pains. More severe pain is experienced when stressful events deplete hormones resulting in fibromyalgia — a condition which is not age-related and primarily occurs in women due to their more intricate hormonal balancing and the rapid decline of progesterone.”

Understanding Chronic Pain

Fibromyalgia, a complex pain problem hallmarkd by a myriad of unsavory symptoms (widespread pain, chronic fatigue syndrome, irritable bowel syndrome and joint pain in many cases) is just the tip of the iceberg for chronic pain sufferers.

What scientists are beginning to understand is that extended exposure to chronic pain can actually do its own damage. “Pain causes a fundamental rewiring of the nervous system,” explains Dr. Sean Mackey, director of research at Stanford University’s Pain Management Center. “Each time we feel pain, there are changes that occur that tend to amplify our experience of it.” Therefore, timely therapy is a critical part of chronic pain management — nipping it in the bud early not only alleviates short-term symptoms, but also spares us from further problems.

In today’s fast-paced, technologically-advanced workplace, another common source of chronic pain is from something we’re all victims of — computer overuse and general postural problems. According to Julie Markinen, MSPT, OCS, FAAOMPT of Select Physical Therapy in Austin, “one of the most common types of pain today is that related to either sustained posture (headaches or upper back pain from computer work) or from repetitive microtrauma (moving a mouse back and forth). Other patients are painters with shoulder pain from reaching and working overhead, or runners with back pain resulting from poor trunk stabilization or gait mechanics.”

Gender Differences?

It’s often said that women are better at handling pain than men. Perhaps because the female body is expected to withstand the ordeal of childbirth, it’s assumed that Mother Nature provides superior tools of tolerance. Research disputes this common sentiment, however; a study conducted at Bath University found that women feel pain more easily than men and don’t deal with it as well. When faced with pain, women tend to focus on the emotional aspects of it, which often intensifies the feeling. Men usually stick to viewing pain as a purely physical event, thus lessening the level of discomfort.

Of course, one study hardly qualifies as the final word on the matter, but Clark explains that women can benefit greatly if they focus on endocrine differences when it comes to therapy. “For women suffering from fibromyalgia or other types of chronic pain, the combination of natural progesterone and natural thyroid is the most effective pain therapy,” he says. “These two hormones also work to decrease generalized pain suffered by women.”

Men, on the other hand, are often socialized to minimize their expression of pain, and some scientists believe that factors like genetics, marital satisfaction and the variety of pain types play more of a role than gender when it comes to making measurements. As is usually the case, this battle of the sexes reveals no clear winners.

Tolerating Pain

So, be it a pinprick or a lingering injury, we all feel pain but deal with it differently. Wouldn’t it make sense to be prepared for something so inevitable? It’s virtually guaranteed that runners, bikers and swimmers will encounter
pain as they compete, using swift movements and repetitive motions that test the strength and stamina of relatively delicate muscles, ligaments and tendons. Contact sports similarly push the limits of the human body, making for many painful and crushing moments.

Modern pain theory tells us that in terms of pain threshold we’re all pretty much on the same playing field, but pain tolerance is another story. The clenched jaw and fiery eyes of a determined but suffering athlete who sticks around for the last round of the game is hardly a foreign sight. Motivated by high stakes, team spirit or personal pride, these hard-core players often swallow their pain until they’ve done what they came for. It’s not possible to fully prepare for these defining moments — to train for pain, so to speak — but it’s no surprise when determination and drive are able to briefly quiet physical agony.

**Treating Pain**

For dealing with daily discomfort, regular people and super athletes alike have learned to look beyond quick fixes like aspirin and prescription painkillers in order to mask their pain at a deeper level. Using the mind to control the body isn’t as far out as it sounds — Lamaze classes, hypnosis and massage demonstrate alternative ways that we try to overcome suffering in everyday life; distraction and imagery techniques can be surprisingly effective, too.

Today the main elements of pain management fall into one of the following classes: injection therapies (nerve blocks like epidurals); physical therapy and exercise; behavioral techniques that include relaxation training, biofeedback and psychotherapy; and hormonal therapies for chronic ailments like fibromyalgia. Even dietary supplements like tryptophan are thought to work as natural pain relievers, while meditation, lifestyle changes and weight-loss diminish symptoms as well.

Even beyond conventional pain treatment, however, most experts agree that keeping the body in tip-top shape is one of the best ways to keep pain at bay. “For many people, pain can be reduced or eliminated with a combination of natural hormones, proper diet and appropriate exercise,” says Clark. As it turns out, maintaining a healthy lifestyle and exercising regularly may be our best defenses for staying pain-free.

“Good muscle function can be one of the best protective mechanisms for joints,” explains Mankinen. “Plus, proper nutrition, hydration and eating habits allow for good muscle growth while minimizing nerve-related pain. Finally, smoking is highly correlated with the development of chronic pain syndromes.”

**Managing Pain in the Future**

What are some future pain therapies patients have to look forward to? “The future is when more clinics and practitioners recognize other therapies besides pain medication, anti-depressants, surgery and painful shots,” Clark says.

According to Mankinen, earlier identification of musculoskeletal problems and advocating fitness later in life are two ways pain therapy is already changing. “Screenings for posture, skeletal structure, and overall conditioning will be important in the prevention of pain of all ages and levels of activity. Plus, we’re getting better at managing pain related to the aging process, by making sure that even the elderly maintain a good physical fitness regime.”

In the end, pain may have many mysterious faces, but that doesn’t mean we must always be at its mercy.
the science of pain

Upon closer look, the simple sensation of pain is anything but. Defined by a complex series of reactions, pain involves interplay between muscles, nerves and the brain.

**Motor Nerves**
Also known as efferent neurons, motor nerves coordinate muscle contraction so we can appropriately react to pain. Notably, all motor nerves' mechanism of action is through the release of a neurotransmitter called acetylcholine.

**Brain**
The thalamus within the brain serves as the central command center — a sorting and switching station of sorts for a variety of pain signals. Depending on the type of pain, the thalamus pushes the message either to the somatosensory cortex (physical), the limbic system (emotional) or the brain's frontal cortex (mental).

**Sensory Nerves**
Extending from your skin, muscles and internal organs, sensory (or peripheral) nerves detect pain, as well as other common sensations such as touch, pressure, vibration and temperature. Once pain hits, sensory nerves communicate directly with “gatekeeper cells” in the spinal cord before the filtered message is sent onto the brain.

**Pain Receptors**
Pain comes in many forms, but typically begins as an acute disturbance within a specific part of the body. Nocireceptors (most concentrated in injury-prone areas such as the fingers and toes) detect pain and relay the message via peripheral nerves to the brain and spinal cord. Sensations of severe pain are transmitted almost instantaneously.

---

**What Happens At Each Nerve?**
While peripheral nerves sense pain and motor nerves react to it, spinal cord nerve cells can actually release special chemicals that intensify pain — increasing the strength of the signal that reaches your brain — in a process known as wind-up or sensitization.

**The Release of Substance P**
Substance P, a peptide that reacts with neurokinin receptors, produces the sensation of pain. Much research has been devoted to Substance P-blockers (like capsaicin found in chili peppers and Icy Hot) to lessen or eliminate the pesky problem of pain.