PSYCHING

Researchers believe pain is spawned by emotional, as well as physical, sources

BY JOEL GREENBERG

A child falls and scrapes his knee. Mother responds to his crying by coddling him with kisses and cookies. It is not long before the youngster notes that this type of attention seems to follow all such teary scrapes — even tears without scrapes.

This may be the way some people first learn about what researchers call "pain behavior" — the series of signals — actions, gestures and words — meant to convey a person's pain to the outside world. Although it frequently does accurately reflect physical pain from a traceable injury or disease, pain behavior often persists for months or years after the physical bases for pain have faded.

The latter case is called "chronic pain" and is as real and painful to its victims as the acute pain of an immediate injury; its debilitation is long-lasting, frequently lifelong. And it is widespread — an estimated 75 million Americans suffer from chronic pain, with 50 million of those classified as partially or completely disabled. The annual cost of chronic pain, in treatment and work days lost, is an estimated $57 billion, almost one-third of which is accounted for by the 23 million people with back pain, and a nearly comparable amount by the 28 million suffering from arthritis, rheumatism and related problems. Add to this another $18 billion pricetag for acute pain and you've got what University of Washington pain specialist John J. Bonica calls "one of the most pressing issues of our time."

Until recently, medical researchers had viewed pain as a symptom or consequence of something else. Now, the study of pain as a separate and distinct entity is emerging as a major field of research — as evidenced earlier this year by a conference of the presidentially mandated Interagency Committee on New Therapies for Pain and Discomfort.

While much about the biochemistry of the pain process has already been learned (SN:10/14/78, p. 266), science is just beginning to probe the psychological aspects of pain and the behavior that accompanies it. "Learning, and conditioning, *is* a cause of acute and chronic pain," says Bonica, a former wrestler who has suffered his own chronic hip and shoulder pain for years. Wilbert E. Fordyce, a colleague of Bonica's at the University of Washington, says, "In a chronic [pain] person, pain behavior may be influenced by factors quite unrelated to nociception [the reception of a pain-causing injury]. The symptom often becomes the problem itself."

Statistics compiled by the State of Washington reveal that of all persons with chronic pain receiving workman's compensation (more than half of whom are classified as permanently disabled), nearly eight of 10 exhibit no physical basis for their long-term pain, Fordyce says. If persons with disc problems are eliminated from that sample, then more than nine of 10 show no physical source of nociception.

Fordyce says that personal, emotional problems are far from the sole source of chronic pain in such cases. Rather, he points to a "systematic relationship" between the person and the environment as a major cause. "People who have something better to do don't hurt as much," Fordyce says simply.

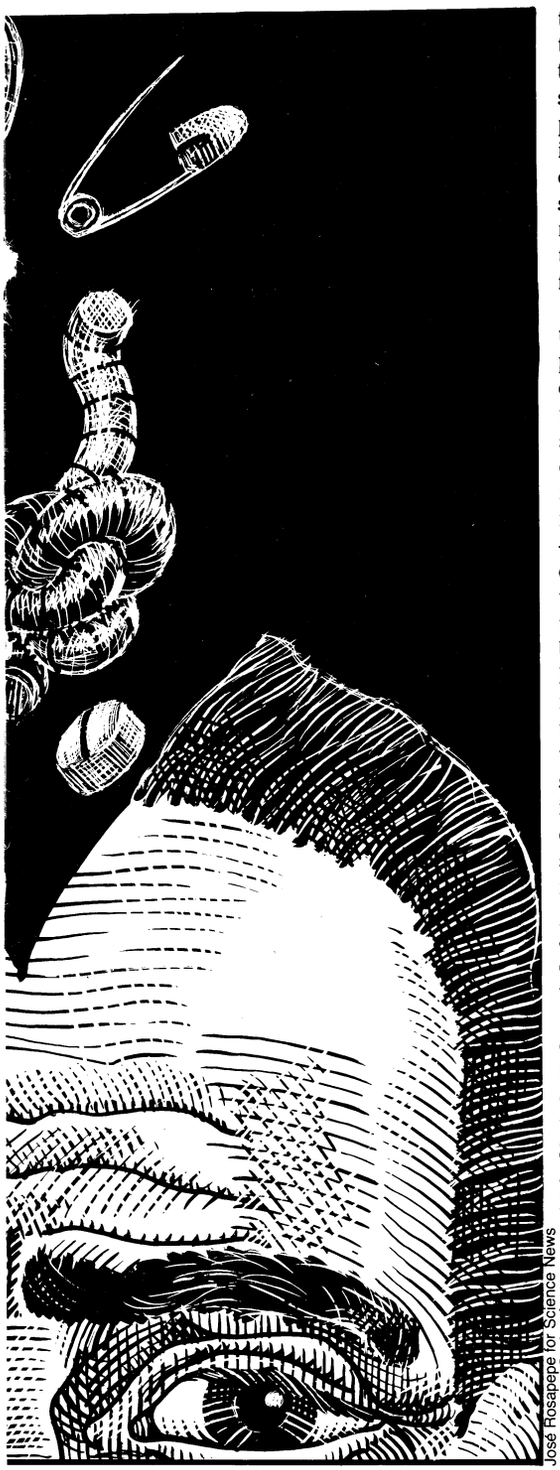
In his own treatment program, Fordyce works with persons who, on the average, have had pain for seven years, been out of work for three-and-one-half years, have had 2.7 major surgeries and "do not have an observable, ongoing disease process." Most of his patients "show significant pain behaviors not due to nociception." In their behavioral approach, Fordyce and his colleagues "withdraw reenforcers" for things such as bed-rest and strong pain medication that they believe perpetuate pain behavior after the acute stage. At the same time, the scientists encourage and reinforce "well behavior" through a carefully designed exercise program.

In the study, Fordyce found that as patients' exercise time and performance increased, their pain behaviors decreased. This was true even if the person complained of too much exercise. But, he emphasizes, such an approach does not apply to acute pain, which may require rest and can be aggravated by exercise. In a test sample of patients in the exercise program, Fordyce reports that 90 percent of the women and 40 to 60 percent of the men have been able to avoid additional surgery, hospitalization and medication and 60 percent of the women and 15 percent of the men were able to return to household work and/or outside employment.

While these studies were performed with basically emotionally healthy persons, other work suggests that individuals with severe psychological problems may have altered perceptions of pain. Several studies indicate that persons with schizophrenia are relatively insensitive to pain from ulcers, appendicitis, certain fractures and heart attack. In other experiments, schizophrenics exhibited much higher pain thresholds to various stimuli, including heat, cold and electrical current, says Glenn C. Davis, chief of the unit on drug abuse at the National Institute of Mental Health's Biological Psychiatry Branch.

Such results have prompted specula-

OUT PAIN



José Rosapepe for Science News

tion that perhaps schizophrenics possess an unusually high level of endorphins and enkephalins, natural opiates in the brain. The Davis group tested the opiate-blocking drug naltrexone on a sample of schizophrenic patients. While the researchers found no change in behavior, "the change in pain sensitivity was striking," Davis says. The patients on naltrexone were considerably more sensitive to pain. The researchers have also found that depressed and manic-depressed persons frequently complain of day-to-day pain but paradoxically—like schizophrenics—appear to be unusually insensitive to experimental pain stimulation. Davis suggests that this insensitivity phenomenon might represent a "compensation" attempt by depressed persons to offset the failure to regulate their own emotions.

But in the "normal" and emotionally disturbed person alike, growing evidence points to a definite involvement of brain chemicals — particularly endorphins — in the pain perception process. In the first such test with human beings, NIMH psychologist Agu Pert found that after submerging one hand in ice water for one minute — an extremely painful experience — volunteers' "periphery" levels of beta endorphin (the large opiate-like molecule that contains enkephalins) jumped 23 times higher than their baseline levels. Using a newly developed assay technique, Pert and his colleagues analyzed saliva to measure the beta endorphin released from the pituitary into the bloodstream. Although he is "not sure what function" is served by the huge beta endorphin release into blood plasma, "the meaning is significant," says Pert, who was one of the six subjects used in the experiment. Whatever its function, beta endorphin is "part of the pain/stress response ... a product of pain and stress," he says. Similar results were obtained previously with pregnant rats who were in labor, he says.

Scientists believe that enkephalin and endorphin production can also be stimulated from other pain sources, such as electric current, and also by placebos used to combat pain (SN: 9/2/78, p. 164). Subjects who reported decreased pain after receiving placebos or acupuncture have reported increased pain when given the opiate-antagonist naloxone. Since naloxone blocks the action of opiates — including those manufactured in the brain — the results indicate that placebos and acupuncture work at least partially by increasing endorphin and enkephalin levels in response to pain.

Conspicuously absent from this group of alleged endorphin activators is hypnotism. Believed by some to be simply one type of placebo effect, hypnosis now appears to work by another, perhaps more mysterious, method. "Psychological factors [have] tremendous power to alter the pain experience," says Martin T. Orne, a psychologist and psychiatrist at the University of Pennsylvania and director of the Unit for Experimental Psychiatry at The Institute of Pennsylvania Hospital.

In a recent experiment, Orne compared 12 highly hypnotizable people with 12 who had repeatedly failed to respond to hypnosis. But through an elaborately deceptive procedure, the 12 nonresponders were convinced that they could be, and had been, hypnotized. All 24 were then subjected to pain by applying a tight blood pressure cuff around their arms and having them repeatedly squeeze a rubber bulb which pumped water from one flask to another.

After establishing a baseline with no attempt at consciousness-altering, Orne repeated the test under hypnotic procedures, and then again by administering a pill the subjects (and experimenters) believed was Darvon but was actually a placebo. While the reaction of both groups to "Darvon" was nearly equal, the hypnotizable group experienced much more pain relief during hypnosis. This means that, unlike the placebo effect, simply expecting to be hypnotized cannot trigger the benefits derived from hypnosis itself, Orne says. And, he notes, "the amount of benefit they [hypnotizable subjects] derive from hypnosis is vastly greater than the amount of benefit they derive from a placebo. Nevertheless, he says, the unhypnotizable individual still appears to get some pain relief, although less than that of members of the other group. Still, Orne concludes, hypnosis and the placebo effect operate by significantly different mechanisms.

The work of Orne, Pert and others demonstrates that psychological and neurochemical factors are at work in acute, as well as chronic, pain. "A bee sting to someone with many allergies can be terrifying, as can a toothache to an individual with an unfortunate dental history," Orne says. "It is not uncommon for athletes to suffer injuries during a game without becoming aware of any discomfort, though once the game is over they quickly become aware of the exquisitely painful nature of the injury. ... Most of us are astonished when we see a clear-cut example of such psychological factors overriding the neural impulses which would normally be experienced as severe pain."

While few experts deny that pain — acute or chronic — is a physical reality to its victim, they are calling for more research attention to the emotional, as well as all other, aspects of pain. "Pain may mean anxiety, fear or depression," says Richard G. Black, co-director of the Pain Treatment Center at Johns Hopkins Hospital. "Telling another person you're scared may be too personal. ... Pain may be a culturally acceptable expression of human suffering." □