

Examining the Thinking Body



Dr. Norman Kettner

Chronic pain can act like a thief, creeping into patients' bodies and robbing them of their ability to live a carefree life. For some patients, every day demands courage to face their physical challenges and the aches of isolation and depression that often invade their spirit.

A recent Institute of Medicine Report, *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education and Research*, finds chronic pain not only plagues more than 100 million patients; it's also exhausting our health care system. The report attributes at least \$560 to \$635 billion annually to the cost of treating pain, an amount equal to nearly \$2,000 for every person living in the United States. The figure includes the cost of health care and lost productivity, which accounts for roughly \$300 billion.

For health care professionals, managing patients' chronic pain can prove a daunting task, especially in cases fraught with subjective findings. To effectively treat pain, we have to relentlessly seek its source. Karel Lewit, MD, DSc, an international authority on manual medicine, reminds us, "He who treats the site of pain is lost."

Today, researchers and Logan's Radiology Department Chair Dr. Norman Kettner are pointing to—what at one time seemed—an unlikely source of pain: the brain.

"The brain exhibits bidirectional pain processing pathways, which travel to the cortex from the pain source within the body but also to a descending inhibitory

pathway that may reduce pain signals at the entry into the spinal cord," said Dr. Kettner. "This is an important finding. In years past, some of the greatest neurosurgeons believed the cortex had nothing to do with pain because their surgical ablation, focused in the sensory cortex, did little to interrupt pain. They didn't know there was a complex pain processing network. But today through advanced neuroimaging, we can map cortical and subcortical circuitry during the experience of experimental or clinical pain."

Dr. Kettner says one of the unexpected derivatives of pain neuroimaging research has been the clarification of placebo response mechanisms. These mechanisms, he explained, demonstrate the inherent healing power in the mind-body interplay. A patient or subject who is placed in a healing context with the perception, expectation or belief in the clinical benefit of a particular treatment often experiences significant pain reduction and healing benefit even when the intervention, such as a placebo pill, has no active ingredient.

Likewise, Dr. Kettner says there is a converse mechanism known as nocebo response where expectation and belief of negative outcomes translate into poorer clinical outcomes. Patient expectations and beliefs are influenced by psychosocial as well as the biological factors (tissue damage) and are important to understand to optimize clinical outcomes.

As physicians, how do we then treat patients who *think* they are in pain? Dr. Kettner advises a thorough biopsychosocial assessment recognizing that the mind and body (biopsychosocial) are not only connected, they are inseparable.

The biopsychosocial model he subscribes to considers patients' attitudes, emotions and beliefs as playing a role in the evolution of their pathophysiology and their clinical management. To support this hypothesis, Dr. Kettner points to the data that the hypothalamic-pituitary-adrenal (HPA) axis regulates the body's homeostatic balance.

"Where there is disruption of the HPA axis by internal or external stressors, patients can experience a variety of neurological symptoms, which can range from pain and clinical depression to irritable bowel syndrome," said Dr. Kettner. "When our research team and others have imaged the effects of acupuncture, for example, our findings suggest the brain may be responsible for transducing the needle stimulus into a complex network of signals that restore and maintain homeostatic balance. Essentially, the brain (mind) has the capability to reach down into the body and modulate pain and normalize autonomic function in the HPA axis assisting the healing response."

According to Dr. Kettner, disease arises from the confluence of anatomic, physiologic and psychosocial events. The problem, he says, with health care is that we approach these three areas separately.

The Brain and Patients' Pain

This past December, Dr. Kettner took his lessons on chronic pain and the mind-body relationship to some unlikely students: first- and second-year medical students on the Saint Louis University (SLU) campus. There, the renowned chiropractor and radiologist exposed the class of future medical doctors to the biopsychosocial model, addressing how patients' beliefs and emotions can influence their physical health.

"Why does pain chronify?" Dr. Kettner asked the SLU medical students. "Alterations in neuronal activity identified as sensitization, although initially protective, may persist until long-lasting effects known as neuroplasticity develop in the central nervous system. Simultaneously, self-defeating patient beliefs and expectations (catastrophization) are interacting with

pain-reducing neural networks promoting pain chronicity. Typically, the presence of chronic pain is dominated by subjective clinical findings. When clinicians encounter complaints without objective findings, they often dismiss them as imaginary. The patient senses this unfounded suspicion of their pain experience and an adversarial, rather than healing, relationship may evolve.”

To offer the SLU students a closer look at the brain’s influence on pain, Dr. Kettner shared images and findings from several acupuncture studies. The investigations employed functional magnetic resonance imaging (fMRI) to study acupuncture’s effects in pain patients with neuroplastic reorganization as an outcome measure.

Dr. Kettner and his research team found:

- Acupuncture changed cortical and subcortical function and increased communication and connectivity among the brain networks involved with pain processing and antinociception
- Chronic pain patients use a maladaptive form of cortical and subcortical neuroplasticity to maintain chronic pain

Often, the initial tissue injury (bio) has resolved but beliefs, fear, anxiety and expectations of continued pain (psychosocial) have become learned (neuroplasticity) fostering the pain chronicity. Dr. Kettner said these findings are directly in line with the very definition of pain, as recommended by the International Association for the Study of Pain: an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Merksey 1979).

For these cases, Dr. Kettner recommends physicians follow a specific course of action: Consider the patient’s psychosocial influences along with the biological and do not dismiss claims of pain when clinical testing, i.e., physical exam, MRI or labs, provide little objective explanation for the patient’s pain presentation. A trial of chiropractic management will often benefit the chronic pain patient serving as the most useful and cost-beneficial diagnostic test.



Dr. Linda Smith

An Early Introduction to Chiropractic

Listening attentively to Dr. Kettner’s lecture sat Dr. Linda Smith, an August 1982 Logan graduate. Dr. Smith paved a path for integrative health education on the SLU Medical School campus.

“I’ve been in private practice now for 30 years and during this time I have been subjected to interruptions in my patient care by other health practitioners who didn’t understand or wish to co-manage chiropractic patients,” she said.

Dr. Smith served as a panelist for the Complementary and Alternative Geriatric Health Care conference organized by Dr. Kettner and held on the Logan campus in collaboration with Saint Louis University School of Medicine. There, she approached fellow conference speaker Joseph Flaherty, MD, a professor of medicine at SLU and its Geriatric Research, Education and Clinical Center, about addressing SLU’s medical students. Coincidentally, the medical school’s dean of curriculum was contemplating a new course to help his students understand alternative health practices. A school survey, at the time, had uncovered that SLU’s medical students were eager to understand and learn about other health options, and the dean of curriculum was committed to closing this information gap.

No stranger to the classroom after teaching for Logan in the 1980s, Dr. Smith returned to teaching, but this time she would instruct, and influence, future medical doctors. Her elective course “Alternative Skills” introduces students to the philosophies and health benefits of chiropractic, acupuncture, massage therapy, meditation and yoga.

Now, in her fourth year of teaching at SLU Medical School, Dr. Smith says the response to the material has been “very positive.” “I am hopeful that as a result of this class, the future doctors I have taught will have a better understanding of alternative skills and an appreciation for mind-body practices,” she said.