

On the Front Lines

Learning from Iraq, military physicians craft new strategies for managing chronic pain.

BY JAMIE TALAN

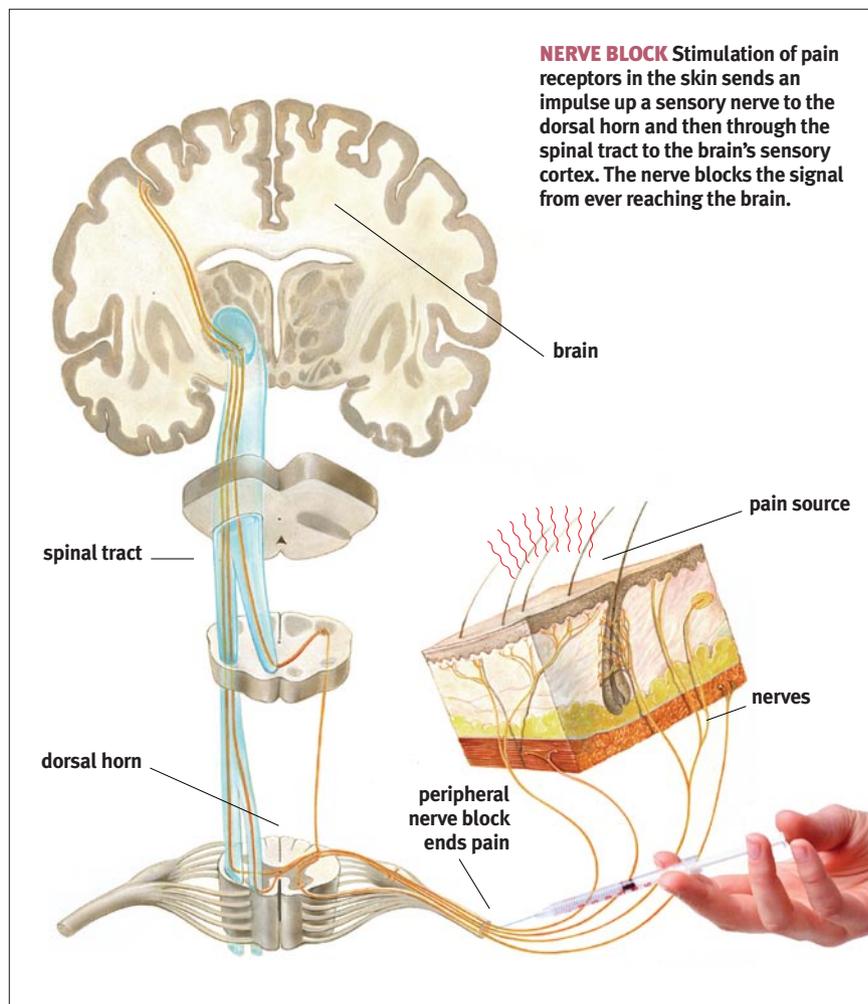
For 24-year-old Ryan Miller, all was too quiet on the Iraqi front. In August 2007, the West Point graduate from Staten Island, NY, was deployed with the Second Striker Cavalry to Karkh, an area along the international zone that hadn't seen much action. "It was safe," says Miller. "We never got attacked."

Miller had just earned his Expert Infantry Badge and was aching for action. The troops walked the streets of Karkh six to 12 quiet hours a day and, Miller says, he never felt threatened. But that was soon to change one day last October as he climbed aboard the truck on what he thought would be a routine patrol.

It was a matter of minutes before Miller heard an explosion muffled by his ear protection. An Explosive from Projectile, or EFP, hit their truck, touching down "like a knife through butter," Miller explains from his hospital bed at Walter Reed Army Medical Center in Washington, D.C. One of the soldiers died; six of the seven others were injured. Slipping in and out of consciousness, Miller heard a soldier lying beneath him screaming and managed to reach for the latch, push it open, and tumble out four feet to the ground. He couldn't stand. Up until that moment, there was no pain. But that would soon come.

PAIN: MORE THAN A SYMPTOM

Like 12,000 American soldiers in Iraq injured during the war, according to Department of Defense estimates, Miller would soon be given morphine, epidural pain blockers, and a mix of medicines that would help ease his pain and get him through 10 surgeries to save his leg and mend his fractured bones. He was initially treated at a combat hospital and then at the U.S. Army hospital in Landstuhl, Germany. From there, he was flown to Walter Reed, where about



a dozen specialists, including pain management experts, worked round the clock to tend to his wounds.

Lieutenant Colonel Trip Buckenmaier III, M.D., chief of the Army's Regional Anesthesia and Pain Management Initiative, says that virtually every soldier injured gets some type of pain management—from Motrin to an epidural block to a low dose infusion of the anesthetic ketamine—and, of course, morphine, which has been used since the Civil War to manage pain.

But Dr. Buckenmaier and his colleagues are revamping the way the

military practices medicine. They are trying hard to avoid "soldier's disease," which occurs when war-injured troops get hooked on morphine. "When you just use one drug to manage pain, people can get into trouble," the physician explains. "Until this war, pain management stopped at morphine."

The modern military's medicine cabinet is designed to treat pain not as a symptom but as a disease of the central nervous system. "We look at pain not as a symptom of disease but as a disease in and of itself," says Dr. Buckenmaier. "The nervous system becomes

PURPLE HEART
Iraq veteran Ryan Miller
on his feet again, with
friends Jacqueline Sans
Ferguson [middle] and
Lily Guenther [right].



overwhelmed and develops maladaptive pathways that lead to chronic pain," he explains. "We want to stop this process during the acute pain phase, with hopes of preventing chronic pain problems."

BLOCKING NERVE SIGNALS

To this end, military doctors are using a mix of narcotics, anti-seizure medicines, non-steroidal anti-inflammatory agents, and nerve blocking agents. They are also using peripheral nerve stimulators to insert pumps that deliver regional doses of anesthesia for days to weeks. These peripheral nerve blocks have been used successfully on wounded soldiers in Iraq since 2003. Dr. Buckenmaier says there is growing evidence that anesthesia can be delivered close to the nerves surrounding the wounded area in order to block pain signals before they are transmitted to the brain. (See illustration on page 33.) The anesthesia, because it is localized, can be continuous and causes no sleepiness. The soldiers often report feeling no pain.

The military is now training doctors in battle to deliver continuous peripheral nerve block on the heels of an injury. The sooner the pain signals are blocked, the better patients fare in dealing with their wounds. And by performing the nerve blocks using ultrasound technology, doctors can see the nerve response while they guide the needle into the target region. The army's success in treating soldiers has led pain specialists outside of the military to adopt these technologies for use on their own pain patients.

PREVENTING CHRONIC PAIN

Mark P. Jensen, PhD, a professor in the department of rehabilitative medicine at

the University of Washington School of Medicine in Seattle, agrees that aggressive pain management early on is critical for preventing pain. He and his colleagues studied 57 patients with lower limb amputations following a traumatic injury and found that those who had intense pre-amputation pain were more likely to experience chronic pain, particularly in the area of the missing limb after the operation. The findings were published in the February 2007 issue of *The Journal of Pain*.

Dr. Jensen says that aggressive pain management before and after surgery could help prevent chronic pain syndromes. He and his colleagues are also testing the benefits of psychological interventions like cognitive behavioral therapy, hypnosis, and neural feedback to help patients alter the brain activity that triggers phantom pain.

Like Dr. Buckenmaier, Dr. Jensen describes pain as a central nervous system disorder. Pain information is sent from the site of the injury to the brain for processing, he explains. Primary information about nerve damage comes up through the spinal tract and into the brain region called the thalamus. From there, it branches out into the areas of the brain that regulate sensory information. The brain encodes the location of the injury and the quality of the damage and sends out more projections to areas that control emotional experience (telling us, for example, how much should we worry about the injury). The information goes on to the frontal cortex of the brain that puts the whole experience in context to other events in the person's life. "You can influence how much a person says 'ouch' by controlling these networks," or brain pathways, Dr. Jensen says.

Lieutenant Colonel Steven P. Cohen, M.D., director of medical education for the Pain Management Division at Johns Hopkins School of Medicine and director of chronic pain research at Walter Reed, is currently deployed to the U.S. military hospital in Landstuhl. The biggest risk factors for developing chronic pain after acute injury are prolonged pain, increased intensity, and psychological predisposition, he says. "A multidisciplinary approach is the best way to deal with pain. This includes medicines, physical therapy, counseling, and interventions to prevent depression and post-traumatic stress disorder. Acupuncture has been popular at Walter Reed."

At press time, Miller was expecting to be discharged to St. Vincent's Hospital in New York. His mother, Rita Dougherty, has been by his side since he was flown into Germany. His leg is now pinned into a 360-degree spatial frame called an external fixator. Doctors are hoping the device will help his fractures heal. The young soldier is upbeat despite his injuries, which also include the loss of a third of his large intestine and nerve damage to his sphincter that require him to wear a colostomy bag. Miller doesn't know what his military future will bring, but he hopes to be back in Germany with his troop by the end of next year. And of that day in October, one of Miller's most vivid memories is waking up from the initial 10-hour surgery, his commander at his bedside, and a Purple Heart in hand. NN

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