Pain Relief: New Connections

By Charles Masarsky, DC, FICC

Author’s Note: Each patient education article in this column is written for your current and potential patients. It draws on the research documented in Somatovisceral Aspects of Chiropractic: An Evidence-Based Approach, co-edited by Marion Todres-Masarsky, DC. Whenever possible, I have updated the material from the textbook with more recent research findings.

My partner, Dr. Marion Todres-Masarsky, and I practice in the Virginia suburbs of Washington, D.C. Our patients often express an interest in the latest findings in the health sciences. The exact significance of a new research finding is often not understood immediately. Nevertheless, it is a good intellectual exercise, for our patients as well as us, to consider what the new information may mean. The following article discusses a paper published just this year, placing it in its historic context. (Congratulations to Drs. Bakkum, Henderson, Hong, and Cramer on their research.) Please feel free to use this article as a front-desk or lay-lecture handout, for your bulletin board, or for any other in-house patient education use.

In the final decades of the 19th century, a Spanish anatomist with artistic training, Santiago Ramon y Cajal, discovered a fundamental fact about the nervous system. Working without grant funding, Ramon y Cajal prepared slides of brain and spinal cord tissue in his kitchen, modifying the latest methods for staining tissue samples until he could clearly see the nerve cells (neurons) through his microscope. When he made drawings of what he saw, Ramon y Cajal showed the neurons as completely individual cells with slight gaps between one neuron and another.¹ A few years later, a British scientist, Charles Sherrington, termed such a gap a synapse.²

Today, the concept of the synapse is central to our understanding of how the nervous system works. How, when and where information travels through the brain, spinal cord and individual nerves is determined by where the synaptic connections are located, as well as how active those connections are. It was once thought that this synaptic circuitry mostly is determined by our genes plus the influence of early childhood, and that this circuitry is "hard-wired" by adulthood. Emerging research has strongly suggested that the formation of new synapses continues throughout life.³,⁴
The formation of new synapses seems to be an adaptation to major changes in an individual’s body or activities. The changes requiring this adaptation can be something good, such as learning to play a new musical instrument. Sometimes these changes are severe, such as the loss of a limb. Either way, such major changes in a person’s body or activities can trigger changes in the synaptic circuitry. These changes apparently are part of an adaptive rewiring of the nervous system.

In the chiropractic profession, we deal with misalignment or restriction (subluxation) of joints, usually in the spine. These subluxations disturb nerve function, thus generating pain and various health problems. However, up until the summer of 2007, it was not known whether or not subluxation was a significant enough event to trigger changes in the synaptic circuitry deep within the spinal cord. We may now be on the verge of knowing.

In a recent study, researchers surgically fixated several vertebrae in the lower backs of two rats, creating a situation analogous to the restriction of a subluxated area. When the spinal cords of these rats were examined under an electron microscope, they were found to contain more synapses and a greater percentage of active synapses than rats that did not have these surgical fixations.

These changes were not due to pressure or any other direct mechanical influence on the spinal cord. The surgery strictly involved the spinal joints, which are located well away from the cord itself. The surgery was designed to disturb normal joint activity and therefore, incoming information about joint activity. In other words, the surgery distorted spinal cord information, not spinal cord tissue. Interestingly enough, the portion of the spinal cord where these changes were noted is the portion that handles incoming pain signals.

While this study is very small (and the results must be considered preliminary), it suggests that subluxation can cause what amounts to a significant rewiring of the pain circuitry in the spinal cord itself. Future research will be required to confirm this finding. It should be noted that pain signals do much more than give you the conscious sensation of pain. These signals create a great deal of reflex activity. The end result of these reflexes can include muscle spasm, increased heart rate and an increased pressure in certain blood vessels, among other effects.

Doctors of chiropractic are widely utilized for their ability to help patients overcome back pain, neck pain, headache and other symptoms of “pinched nerves” in the spine. The recent research findings reviewed above indicate that the effects of a vertebral subluxation may not be restricted to a single nerve at all. In fact, subluxation may bring about a synaptic rewiring of the spinal cord. This could potentially disturb muscle
tension, heart rate, blood flow and other reflex activity that can be influenced by pain. If so, correcting subluxation with chiropractic adjustment would not only "unpinch" a nerve, but would remove a bad influence on the spinal cord itself.

References


Click here for previous articles by Charles Masarsky, DC, FICC.