http://www.spinephysicians.org/dr0wia.cfm

The Spine

The dynamics and supportive properties of the human spine are provided by:

- an intricate network of blood vessels
- countless specialized nerve endings
- hundreds of small nerve fibers which connect to structures of the spine
- more than 220 specialized ligaments
- greater than 120 individual muscles
- over 100 intricate joints
- 34 vertebrae
- 24 presacral vertebrae -----movable
- 5 sacral and 3-5 coccygeal vertebrae------non-moveable
- 31 pairs of spinal nerves
- 23 intervertebral discs

The human spinal column provides flexibility for movement, support for weight bearing and protection of nerve fibers. The spinal column surrounds and protects the spinal cord, which is the main pathway of communication between the brain and the rest of the body. The spinal column also protects the nerve roots and part of the autonomic nervous system.

The spine has three major types of joints:

- synarthroses
- diarthroses
- amphiarthroses

The vertebral column consists of 24 presacral (moveable) vertebrae

- 7 cervical vertebrae
- 12 thoracic vertebrae
- 5 lumbar vertebrae

The sacrum and coccyx are composed of fused vertebrae and are also considered part of the spinal column.

The cervical vertebrae are the most mobile of the 24 presacral spinal vertebrae.

The 12 thoracic vertebrae articulate with 12 pair of ribs. The thoracic spine is designed for a minimum of movement, thus providing protection for the internal organs.

The large stocky lumbar vertebrae are designed to support the weight of the body.

Electromyography (EMG)

Needle electromyography (EMG) is used to assess the health and integrity of the motor nerve fibers of the spinal cord, the spinal nerve root, the plexus and the peripheral nerves. Electromyography is used to measure tiny electrical discharges produced within a muscle. A physician may recommend the EMG test when a patient reports muscle weakness and the physical examination confirms a reduction of muscle strength. The study is used to help diagnose muscle and nerve disorders. The needle EMG study can be used to localize the site of nerve compromise and to assess the degree and duration of nerve injury.

The needle electromyographic study is a common procedure used to assess the health and integrity of muscle in the presence of muscle atrophy and/or weakness. Muscles receive a constant supply of electrical signals, which travel along nerve pathways. Muscles also produce their own electrical signals during contraction. The EMG study of muscle requires the careful placement of a small sterile recording needle into muscles, which receive their nerve supply from the spine. There may be some local discomfort associated with the testing and there may be occasional focal bruising at the site of needle placement/insertion. This thin recording electrode is used to detect the pattern of electrical activity within the muscle. The electrode is interfaced to sophisticated testing equipment, which has software, which records and analyzes the patterns of electrical activity when the muscle is at rest and during voluntary contraction of the muscle. The size, duration training, sophisticated equipment and detailed protocols.

There are a variety of tests, which fall under this heading. Categories of QEMG assessment include: triggered Single Fiber EMG, Stimulated Single Fiber EMG, Macro EMG, Template Matching, Parametric matching, Manual Interference Pattern Analysis, On-line Interference Pattern Analysis, Myofrequency Assessment and Recruitment and frequency of the muscle signals help determine whether there is compromise of the muscle or the nerves, which innervate the muscle. A comprehensive needle EMG study with nerve conduction studies takes approximately one hour to complete.

After two to three weeks of nerve compromise needle EMG assessment of the muscles innervated by the damaged nerve region may reveal abnormal wave forms secondary to a loss of nerve supply to the muscle. The needle EMG study can be particularly helpful in distinguishing peripheral nerve damage from

compromise of a spinal nerve root. The results of EMG tests are often correlated with the results from nerve conduction studies perfomed during the same testing session.

Needle electromyography, together with nerve conduction studies, is essential in the evaluation of suspected radicular and peripheral nerve disorders.

Specialized forms of EMG include:

Quantitative Electromyography (QEMG): Quantitative electromyography is reserved for those patients with unusual or complicated neurologic or muscular disease. It may also be used to evaluate whether there is significant muscle reinnervation after a course of care. It is a more time-consuming study than routine needle electromyography. Select muscles are assessed in greater detail than would be done during a routine EMG study. QEEG requires very specialized analysis.

The types of parameters, which are quantifiably measured, include assessment of the individual muscle fiber (Single Fiber EMG), which may reflect widespread involvement within a muscle, and the assessment of electrical activity arising from an entire motor unit which refers to all those muscle fibers attached to a single nerve fiber. A Template Match Motor Unit analysis provides quantitative characterization of individual nerve and muscle fiber relationships. QEEG can provide a detailed look at the pattern of muscle fiber recruitment during muscle contraction, the quantity of muscle fibers, the firing speed, waveform appearance and the collective pattern of muscle fiber firing in detail.

Back Pain

- Four out of five adults will experience low back pain sometime during their lifetime
- After the common cold problems related to the low back are the most frequent cause of lost workdays in individual over 45 years of age
- Back pain ranks second to headaches as the most frequent location for pain
- Greater than 65 million Americans experience back pain every year
- Back injuries are one of the most common causes for disability
- The annual costs associated with back pain runs into the tens of billions of dollars considering lost productivity, medical expenses and worker's compensation benefits

Cooperative spine care refers to two or more health care professionals who work together to preserve or restore spinal integrity while prioritizing the patient's well being.

Reasons for Cooperative Spine Care

- Reduce the likelihood of unnecessary or duplicative testing Optimize the continuity of care
- Reduce the risk for unnecessary surgery
- Early detection of spinal disorders at varying stages of development
- Expanded criteria for outcome-based care
- Improved patient recovery
- Reduced cost of spine care

Who May Benefit by Cooperative Spine Care?

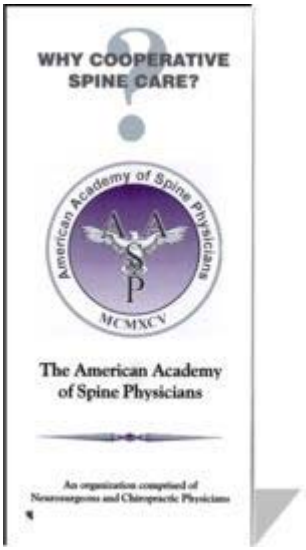
The patient with persistent or progressive pain, numbness, muscle weakness or abnormal spinal movement who is not recovering as expected may require a multidisciplinary approach with the combined expertise of the chiropractic physician and the neurosurgeon to maximize potential recovery.

Benefits of Cooperative Spine Care

The potential patient benefits of cooperative spine care include early diagnosis and intervention, a broad range of therapeutic options, continuity of care, and improved potential for recovery.

Common Ground: The Doctor of Chiropractic and the Neurosurgeon

Chiropractic physicians and neurosurgeons both have extensive training in spinal anatomy, spinal biomechanics, diseases of the spine and neurology as it relates to the spine. Both disciplines can perform or order the necessary procedures to diagnose spine and related conditions. Due to the length of the spine, an individual may have varying degrees of the same pathology occurring at different levels of the spine thus requiring a multidisciplinary approach. Common examples of conditions which may coexist, include degenerative disc disease, pain syndromes, disc herniation, arthritic disease, abnormal spinal joint movement and radiculopathy. The chiropractic physician and the neurosurgeon care for many of the same degenerative spinal disorders at different ends of the disease spectrum.



Early-stage spine disease is often best addressed by chiropractic physicians whereas late-stage spine disease involving potential or actual neurological compromise may require the attention of the neurosurgeon. Intermediate stages of spinal disease may require a cooperative effort between the chiropractic physician and the neurosurgeon.

The chiropractic physician and the neurosurgeon strive to protect and restore biomechanical and neurological integrity of the spine through: early diagnosis, early intervention, patient education and through the prevention of unnecessary surgery.