Dynamic Chiropractic

PHILOSOPHY

Day of the Spine in Paris

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While in Europe conducting a chiropractic research project, we had the extreme pleasure of attending the 1998 International Symposium on Degeneration of the Lumbar Functional Spinal Unit and Physiopathology of Low-Back Pain (LBP). The Paris symposium, which took place on June 6, was sponsored by L'Hôpital Beaujon and featured presentations by some of the leading spine authorities from the United States and Europe. Being the only two chiropractors in attendance, we were excited to see how well our postgraduate chiropractic educational seminars stacked up with the latest research in spine-care science.

We took a high-speed train from Brussels, Belgium down to Paris and arrived just in time for the registration. Usually with international conferences, the common language spoken is English, but as the meeting was heavily attended by French-speaking physicians, the presentations by most of the European researchers were given in French, while the Americans presented in English. Simultaneous French and English translations were given via headsets.

Seventeen presentations were given on topics ranging from basic science and conservative care to instability and spinal surgery. Following the presentations of each topic, the presenters were asked to return to the platform for questions. Microphones were placed in the aisles to facilitate discussion from the participants.

As the program was quite extensive, we will report on the most interesting articles that affect our profession.

The Intervertebral Disc

Dr. Malcolm Pope from the University of Iowa led off the program, followed by Dr. Jill Urban from Oxford University in England. Both researchers focused on degeneration of the lumbar functional spinal unit (FSU), with particular attention to biomechanical aspects. Dr. Urban's presentation was directed at the latest research on the mechanical properties of the intervertebral disc (IVD).

According to Dr. Urban, the latest literature indicates that the IVD consists principally of water containing dissolved solutes and the structural macromolecules collagen and proteoglycan. The proteoglycans, principally the large aggregating proteoglycan aggrecan, are trapped by the collagen network and imbibe fluid, inflating the collagen fibrils and placing the IVD under turgor, enabling it to carry compressive loads. The amount of fluid carried in the IVD depends on aggrecan content, which is found to be high in youthful discs and much less so in older discs. Dr. Urban stated that, although disc cells density is low, these cells are responsible for maintaining and remodeling the matrix and their activity is vital for the health of the disc.

It was proposed that fluid is expressed from the IVD when a load is applied and re-imbibed when the load is removed. If the mechanical load is maintained for any duration the IVD loses volume and height

because water is expressed into adjacent tissues. The amount of fluid loss is controlled by the osmotic and permeability properties of the proteoglycans.

Dr. Urban contended that since one of the major signs of disc degeneration is loss of aggrecan, there is a lot of interest in the mechanisms of aggrecan synthesis and destruction in normal and pathological discs. She stated that mechanical signals and levels of pH and pO2 have a strong influence on aggrecan production and cellular activity. We felt that this presentation was especially important for chiropractic, as our goals include the normalization of loading on these joints. Today, it appears that numerous studies have documented the detrimental effects of abnormal loading on IVDs and the degeneration that occurs as a result.

Dr. Pope's review of the literature included mention of the prevalence of disc protrusions leading to disc prolapse and herniation. IVD protrusion and prolapse are commonly present in 30-70% of the asymptomatic population. Dr. Pope stated that the vertebral end plate and the disc anulus pathways of nutrition are probably responsible for pathological deformation and symptomatology. He acknowledged that the sudden onset of back pain from a protrusion is probably the final event in a longstanding pathology, but this may not be disabling if the vertebral canal is sufficiently wide.

As we listened, we were reminded of the studies that we review at our seminars by Moore and colleagues (Spine, 1992) and Osti et al. (Spine, 1990), that demonstrated how circumferential tears lead to radial tears, and Boos et al. (Spine, 1995), where a high prevalence (76%) of asymptomatic disc herniations were found in an age, gender, and psychosocial-factors-controlled group.

Neo-Innervation and Neo-Vascularization

Dr. Philippe Goupille of Tours, France presented innervation and vascularization of the degenerated disc. Essentially, this was a review of subluxation pathology and a discussion of the pathoanatomical changes that accompany the degenerative process in the spine. He began by reviewing the inflammatory cascade and its effect on fibroblastic activity, collagen deposition in the IVD and periarticular tissues, and the presence of perineural fibrosis around the nerve root. Recent studies have demonstrated that both spouts of blood vessels and nerves accompany the soft tissue fibrosis process. The neo vascularity and associated presence of platelets and RNA messengers seen in degenerated discs may be responsible for the role fibroblastic activity and collagen deposition in these tissues.

It has been well-established that the outer layer of the anulus is innervated, so neo-innervation is the term to describe the ingrowth of neural tissue to regions of the disc where it is not commonly found, such as the nucleus pulposus. Dr. Goupille reviewed a study that appeared last year in Lancet (1997;350:178þ81) and that he co-authored, on the neo-innervation of the IVD using immunohistochemical evaluations in a cohort of symptomatic and asymptomatic individuals. His group found a much higher population of innervation extending to the inner third and nucleus pulposus in chronic back pain patients versus control subjects. This study and others provide evidence that the presence of sprouting of new nerve endings and vascular ingrowth may be important events to help to explain the pathogenesis of chronic back pain. We found this presentation of interest, particularly in studying the objective signs that occur in such patients when examined clinically.

Neurophysiological Aspects from Degeneration to Pain

Dr. Philippe Boulu from Paris presented the lecture "From Degeneration to Pain: Neurophysiological

Aspects of Back Pain." This discussion again reviewed what we have discussed as subluxation pathology in chiropractic. Dr. Boulu stated that there are five basic factors in low-back pain:

1) presence of nociceptors in the tissues; 2) physical stimulation of the nociceptors (chemically or mechanically); 3) peripheral sensitization of the neurons; 4) central sensitization of the neurons; and 5) psychosocial factors.

Numerous studies have demonstrated the presence of nociceptors and their respective afferents in spinal tissues, including the IVD, zygapophyseal joints, and spinal ligaments. Abnormal loading on spinal joints can mechanically stimulate the A-nociceptive afferent fibers, and the consequential production and liberation of inflammatory mediators (cytokines, metalloproteinases, Interleukin-1 & 6) can chemically stimulate the C-nociceptive fibers. As these nociceptive fibers are stimulated, they release neuromediators, Substance P, and CGRP, which can further sensitize the nociceptive afferents. The response to repeated stimulation of these fibers allows them to lower their threshold and consequently, become peripherally sensitized. In this manner, movements that normally do not cause pain become a source of pain.

Joint dysfunction perpetuating the inflammatory cascade allows for continuous repeated stimulation of nociceptive afferents which in turn causes the dorsal horn neurons to be repeatedly stimulated. Central sensitization is the term to describe this process and its clinical signs include mechanical allodynia and hyperalgesia. These terms are generally used to describe the perception of pain in response to normally innocuous stimulation to the skin and other tissues. Central sensitization can explain the maintenance of painful states in the absence of clinical signs. According to Dr. Boulu, prevention of central sensitization by eliminating peripheral sensitization early in the treatment program appears to be a rational approach in the treatment of these patients.

Lastly, Dr. Boulu explained some recent neurophysiological theories involving psychosocial factors in patients with back pain. As he explained it, through the communication of nociceptive information through the thalamus and limbic system to the cerebral cortex, underlying emotions and thought processes can amplify or inhibit nociceptive signals. It was interesting to learn, in this regard, that patients with anxiety, depression, or underlying emotional or psychological problems may have facilitated nociceptive pathways, creating either an exaggerated or prolonged response to pain.

Lumbar Instability and Spinal Surgery

Dr. Iain McCall from Oswestry, England provided a thoughtþprovoking address on the subject of imaging of lumbar instability. He reported that a wide range of normal movement patterns have been reported in assessing flexion/extension radiographs. Although more than 3 mm of translational motion is traditionally considered indicative of instability, studies have reported translational movement of 4 mm or more in 20% of asymptomatic subjects at L4-5. Dr. McCall stated that 4 mm or more of translational movement is associated with injury to the posterior elements of the functional spinal unit.

He also stated that, to more fully comprehend the source of symptomatology in patients, discography and medial branch blocks can provide more definitive evidence of whether an unstable spinal segment is actually the cause of the pain, prior to undergoing more invasive treatment such as a surgery.

In the critical analysis of different forms of spinal surgery, including arthrodesis, cage implantation, disc surgery, and bone substitutes, researchers from Belgium and France concurred that patient selection criteria is of utmost importance. The presenters were careful to acknowledge the failed back

surgery syndrome and to stress that those patients undergoing spinal surgery must have the appropriate signs and symptoms. Notably, the presence of radicular leg pain, with positive nerve root tension signs, progressive neurological deficit, a confirming imaging study, and failure to achieve clinical improvement after 4-8 weeks of conservative intervention were acknowledged to be necessary precursors to surgical intervention.

Another memorable event occurred during the question and answer session during the discussion on different types of conservative care for back and leg pain. A French physician stood up and went to the microphone following a presentation reviewing corticosteriod injections and stated that his and his colleagues' success rate for the procedure was about 20%. The presenter concurred and provided discussion about CT-guided placement and other factors that are considered important. We looked at each other in disbelief. If only 20% of our chiropractic patients responded to our care, we wouldn't have a profession!

The chiropractic profession has constructed a philosophy, science, and art to support our work. To sit in a world-renowned conference and listen as the scientific basis of subluxation pathology was discussed assured us more than ever that we have been chosen to participate in the greatest conservative health care system in the world. It was very interesting to view the latest medical perspectives for treating degenerative and painful lumbar spinal disorders. It was more refreshing however, to realize that the scientific evidence continues to support the existence of and mechanisms involved in spinal subluxation, and the rationale of normalizing joint structure and function via chiropractic adjustments and other rehabilitative measures to address the underlying cause of patients' problems.

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