

SUBLUXATION – MURPHY

continued from page 7

ceptors send out corrupted transducer signals to the neuromuscular control unit, which finds spatial and temporal mismatch between the expected and received transducer signals, and, as a result, there is muscle system dysfunction and a corrupted muscle response pattern is generated. Consequently, there are adverse consequences: higher stresses, strains, and even injuries, in the ligaments, mechanoreceptors, and muscles. There may also be muscle fatigue, and excessive facet loads. These abnormal conditions produce neural and ligament inflammation, and over time, chronic back pain."

Dr. Panjabi's model is nearly identical to what I was taught in the post-graduate diplomate program in orthopedics, taught by Richard Stonebrink, DC, through Western States Chiropractic College. I was thrilled to see Dr. Panjabi's model published, as it is consistent with what many chiropractors propose as being the "subluxation." However, I was concerned that Dr. Panjabi referred to his model as a "new hypothesis." Consequently, I submitted the following letter to the editor and to Dr. Panjabi:

Dear Dr. Panjabi:

Congratulations on your article "A hypothesis of chronic back pain: ligament subfailure injuries lead to muscle control dysfunction" *European Spine Journal*, July 27, 2005.

The hypothesis you presented is consistent with the perspective offered within the chiropractic community for decades. In the parlance of the chiropractic profession you have expertly and vividly described what is referred to as a vertebral subluxation. The chiropractic community has been studying, writing about and modifying its perspective on the phenomenon you articulated for more than a century.

Our present hypothesis suggests that the altered mechanoreceptive afferent driven motor mismatch can be corrected by the firing of the mechanoreceptors of the facet joint capsules which are activated by means of a chiropractic adjustment.¹ The hypothesis you articulated, explains why chiropractic spinal adjustments have proven to be more effective in treating chronic spinal pain when compared to medication, exercise, and needle acupuncture.^{2,3,4,5,6,7,8,9}

Respectfully,
Daniel J. Murphy, D.C.
Practice of Chiropractic, Faculty,
Life Chiropractic College West

References

1. Indahl A, Kaigle AM, Reikeras O et al (1997) Interaction between the porcine lumbar intervertebral disc, zygapophysial joints, and paraspinal muscles. *Spine* 22:2834-2840
2. WH Kirkaldy-Willis and JD Cassidy, Spinal manipulation in the treatment of low back pain, *Canadian Family Physician*, Vol. 31, March 1985, pp536-40.
3. TW Meade, S Dyer, W Browne, J Townsend, AO Frank. Low back pain of mechanical origin: randomised comparison of chiropractic and hospital outpatient treatment. *British Medical Journal*, June 2, 1990;300:1431-7.

4. The Lancet, Chiropractors and low back pain, July 28, 1990, p. 220.
5. TW Meade, S Dyer, W Browne, AO Frank. Randomised comparison of chiropractic for low back pain: results from extended follow up. *British Medical Journal*, August 5, 1995;311: 349-51.
6. Woodward MN, Cook JC, Gargan MF, Bannister GC. Chiropractic treatment of chronic 'whiplash' injuries. *Injury*. 1996 Nov;27(9):643-5.
7. S Khan, J Cook, M Gargan, G Bannister. A symptomatic classification of whiplash injury and the implications for treatment. *Journal of Orthopaedic Medicine* 21(1) 1999:22-5.
8. Lynton GF Giles and Reinhold Muller, Chronic Spinal Pain: A Randomized Clinical Trial Comparing Medication, Acupuncture, and Spinal Manipulation, *Spine*, July 15, 2003; 28(14): 1490-1502
9. Reinhold Muller, PhD, Lynton G.F. Giles, DC, PhD, Long-Term Follow-up of a Randomized Clinical Trial Assessing the Efficacy of Medication, Acupuncture, and Spinal Manipulation for Chronic Mechanical Spinal Pain Syndromes, *Journal of Manipulative and Physiological Therapeutics*, January 2005, Vol. 28, No. 1.

More recently, in 2007, Helene Langevin from the Department of Neurology at the University of Vermont College of Medicine, published another study concerning chronic spinal pain that is consistent with the subluxation complex⁴. Although she does not use the word subluxation in her article, she describes the pathoanatomy and neurological manifestations, and she includes chiropractic in the management of the pathology. Her article notes the following concepts:

1. In chronic low back pain, there is an integration between connective tissue fibrosis and the nervous system perception of pain.
2. Adverse connective tissue fibrosis can be remodeled by applying mechanical forces to soft tissues, including chiropractic spinal adjusting. [It is important to note that chiropractic adjustments were included as the applying of a mechanical force to reverse adverse connective tissue fibrosis and its influence on the nervous system.]
3. "Increased connective tissue stiffness due to fibrosis is an important link in the pathogenic mechanism leading to chronicity of pain." **[Very Important: There is evidence that this adverse tissue fibrosis can be reversed and remodeled by chiropractic adjusting.]**
4. "Abnormal movement patterns can have important influences on the connective tissues that surround and infiltrate muscles." **[Very important because the subluxation complex includes abnormal movement patterns.]**
5. "A hallmark of connective tissue is its plasticity or 'remodeling' in response to varying levels of mechanical stress." **[This is important because it implies that spinal adjusting can initiate remodeling of abnormal connective tissues.]**
6. "Both increased stress due to overuse, repetitive movement and/or hypermobility, and decreased stress due to immobilization or hypomobility can cause changes in connective tissue." **[The causes of subluxation. Note: both increased and decreased motion are deleterious.]**
7. A chronic local increase in stress

leads to micro-injury and inflammation. **[Subluxation can cause micro-injury and inflammation.]**

8. "A consistent absence of stress leads to connective tissue atrophy, architectural disorganization, fibrosis, adhesions and contractures." **[Again, tissue fibrosis]**
9. "Fibrosis can be the direct result of hypomobility or the indirect result of hypermobility via injury and inflammation."
10. "Connective tissue fibrosis is detrimental, as it leads to increased tissue stiffness and further movement impairment." **[Important, fibrosis again]**
11. "Tissue microinjury, inflammation and fibrosis not only can change the biomechanics of soft tissue (e.g. increased stiffness) but also can profoundly alter the sensory input arising from the affected tissues." **[Very Important: many contend that the tissue changes associated with the subluxation alter the afferent input into the CNS, which is the nerve interference of the subluxation.]**
12. "Connective tissue is richly innervated with mechanosensory and nociceptive neurons." **[Very Important]**
13. Activation of nociceptors can contribute to the development or worsening of fibrosis and inflammation, causing even more tissue stiffness and movement impairment. **[Important]**
14. Chronic low back pain may be caused by pathological connective tissue fibrosis, which causes adverse changes in movement. This is well documented in ligaments and joint capsules. **[Very Important]** This pathological connective tissue fibrosis is plastic and can therefore be remodeled. However, the remodeling must take place over time. **[This is very important because it indicates that the basic pathology is fibrosis, and this fibrosis can be remodeled with adjustments over a period of time.]**
15. "In fibrosed connective tissue and muscle, blood and lymphatic flow may be chronically compromised by the disorganized tissue architecture and thus vulnerable to unusual muscle activity (e.g. beginning a new work activity or sport), or to conditions causing further decrease in perfusion such as prolonged sitting."
16. Pain leads to reduced motion, and movement restriction increases fibrosis, "setting the patient up for more painful episodes." **[Very Important, Fibrosis]**
17. "In addition to its role in the pathological consequences of immobility and injury, the dynamic and potentially reversible nature of connective tissue plasticity may be key to the beneficial effects of widely used physical therapy techniques," including chiropractic adjustments.
18. A "carefully applied direct tissue stretch may be necessary in cases of long standing hypomobility with pronounced fibrosis and stiffness." **[Very Important, as an ad-**

justment may be considered to be a "carefully applied direct tissue stretch."]

This article is also very supportive and consistent with the models I learned from Dr. Stonebrink in the post-graduate orthopedic diplomate program.

Lastly, also published in 2007, is an article measuring cortical neurological responses to chiropractic adjusting of dysfunctional cervical joints (5). This article was published in the prestigious journal *Clinical Neurophysiology*, February 2007. This article actually uses the words "vertebral subluxation." Among other terminology. This article notes the following concepts:

1. "Spinal manipulation is a commonly used conservative treatment for neck, back, and pelvic pain."
2. "The effectiveness of spinal manipulation in the treatment of acute and chronic low back and neck pain has been well established by outcome-based research."
3. Spinal dysfunction will alter afferent input to the central nervous system.
4. Altered afferent input to the central nervous system leads to plastic changes in the central nervous system. **[Very Important]**
5. "Neural plastic changes take place both following increased and decreased afferent input."
6. Both painful and **painless** joint dysfunction will inhibit surrounding muscles.
7. Joint dysfunction causes afferent driven increases in neural excitability (facilitation) to muscles that can persist even after the initiating afferent abnormality is corrected. **[This suggests that a muscle afferent problem can persist even after the joint component of the subluxation is corrected. The chronic component of the subluxation may be plastic changes that cause long-term alteration of muscle afferentation.]** This article clearly supports that the joint component, the muscle component, and the neurological component of the subluxation complex are influenced by traditional joint-cavitation spinal adjusting.
8. The altered neural processing that occurs as a consequence of joint dysfunction provides a "rationale for the effects of spinal manipulation on neural processing that have been described in the literature." **[Very Important]**
9. Spinal dysfunction alters the "balance of afferent input to the central nervous system" and this altered afferent input may lead to "maladaptive neural plastic changes in the central nervous system," and "spinal manipulation can effect this." **[Very Important]**
10. The clinical evidence for joint dysfunction that requires manipulation includes:
 - A. Tenderness on joint palpation.
 - B. Restricted intersegmental range of motion.
 - C. Palpable asymmetry of interver-