

# Interpreting Muscle Activity of the Spine

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Muscular involvement in the vertebral subluxation complex has eluded and often confused chiropractors since our inception as a profession. Often our understanding of "what the muscles are doing" amounted to nothing more than "muscles pulling bones out of place." While chiropractic science has marched on, and although we are finally receiving scientific confirmation for what we always have known philosophically, there remains much that we still do not understand. There appears to be as much confusion today in chiropractic as there has ever been when it comes to the muscular activity of the spine. But there has emerged from this shift from anecdotal paradigms to a more scientific rationale -- a demand for an updated understanding of how to interpret the muscular tensions of the vertebral subluxation and that of other muscular activities of the spine.

One such explanation has been applied to a form of spinal analysis with a consistent pattern of myophysiologic findings. We offer here an overview of our understanding based on this method of analysis, and although these findings emerged from a "misalignment model" of the vertebral subluxation, we feel that every chiropractor can benefit from this information as they adapt it to their needs. And so we propose the following:

Clinically, we find that muscular tension is consistently associated with the vertebral subluxation. The degree varies, but inevitably we note that the action of an individual muscle band (such as the multifidus) independent of other bands connected to adjacent vertebrae is positively related to the vertebral subluxation. Upon static palpation of the spine with the patient in a recumbent resting position, palpatory findings include isolated transversospinal muscular activity, often unilateral, and limited to one or two spinal segments.

This has been interpreted as a physiologic defense mechanism which is thought to be mediated by sensory receptors, particularly the muscle spindle.

Now spasm can and does occur in the postural muscles and can affect vertebral placement but does not occur segmentally. This phenomenon of segmental activity is clearly physiologic in nature. In fact, muscular tension above that of normal tone can be due to a number of things, such as emotional strain, guarding spasm (the torticollis of whiplash), fatigue, etc., but all of these things, including nerve interference due to the vertebral subluxation, cause increased muscular tension in more than just one muscle or on one level of the spine.

But as misalignment does occur, the purely mechanical imbalance of the muscle lengths (due to a longstanding misalignment) may contribute to the chronic fixation only in that the apparent "adapted" length of the fibers may cause instability upon correction of the misalignment. The apparent adaptation of fascial lengths is due to the shortening of the periarticular connective tissues on one side, while there would be a lengthening of the fascial planes on the other. But this again would be strictly a mechanical adaptation, while the actual length of the muscle fibers may not have changed, and yet the elasticity of the muscle itself is reduced. In this way, muscles may contribute to the fixation

of the vertebra.

The working muscle concept is based not on physical work accomplished by the muscles in the static position, but in that muscles demonstrate a physiologic mechanism and not a pathologic one. There is no sound pathological explanation for a muscle to "spasm" on a segmental level, while other surrounding muscles are not similarly affected.

Structures such as the joint capsule rich in sensory receptors feed joint-position information to the brain, and it is the brain and spinal cord that ultimately decide where the vertebra was designed to be or what is the best position of the vertebra in relation to the surrounding vertebrae (with structural and functional considerations). Kinesthetic, proprioceptive and equilibrating receptors feed the necessary sensory information to the brain which pools the data and then instantly determines the appropriate muscular response. It is the muscles that are actively utilized to perform and guard articular positioning. Here again, a muscle is said to be "working" if it exhibits an increased tension comparable to the muscles surrounding the vertebra (particularly identical muscles). Using palpation, we can "intercept" the resulting commands and be the beneficiaries of the brain's knowledge of its own biomechanical needs.

The tone of these muscles is available information (by palpation) about the position of the vertebra and the intentions of the nervous system. The misalignment becomes a static condition in which certain muscles are stretched and, therefore, working for correction (as we have described) and in which opposing muscles are shortened. These shortened muscles may become "acquainted and content" with this chronic malposition. The shortened muscles would not be active except to exhibit natural tone similar to the surrounding musculature.

As a corrective force or an adjustive thrust is introduced to the vertebra, this muscle may momentarily oppose the correction of the vertebral subluxation because this would disturb the muscle from its newly attained posture. It seems likely that once the correction of the subluxation had been accomplished, the muscle would then be reset to maintain its original resting length (being the proper juxtaposition of the vertebra). The constant provocation to the joint receptors, the muscle spindles, and the trapped or irritated spinal nerves would now be reduced and, therefore, the contralateral working muscle would also be satisfied and return to its resting tone.

Such muscular activity has been demonstrated in studies concerning the "osteopathic lesion," in motion studies demonstrating the guarding mechanisms of muscles to avert nerve compression upon lateral bending and similarly even in postural studies demonstrating myoelectric activity during the scoliosis in the erect posture.

These studies all parallel our work with the chiropractic vertebral subluxation complex and the muscular reflex activity that we note consistent during the subluxation complex.

Integration of paravertebral muscular reflex action into your assessment of the misalignment should allow you more complete, consistent, and accurate analytical conclusions. Subtle resiliency is encountered upon palpation of these working muscles. The adjustment is made in cooperation with the body's own efforts, allowing for a more specific and gentler adjustment.

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