

Paradoxical Terminology: The Centralization Phenomenon

Craig Morris, DC

One of the great challenges in the professional world is keeping abreast of the explosive growth in clinical terminology. New ideas and products that arise in different sectors or regions can utilize the same names, titles or descriptors but be quite different. This is certainly true in the health care field. For example, we have seen differences in definition while attempting to discuss abnormal intervertebral disc findings, utilizing such terms as bulge, prolapse, contained, non-contained, tear, sequestered, nonsequestered and herniation.

One term that has become a part of our vernacular is centralization. While this word may be defined as "being brought toward the middle," there are two physiological definitions, one from the East and one from the West, that I feel are vitally important additions to our clinical understanding. The purpose of this paper is not to resolve these disparate definitions for the same word, but to merely expose and define them so that the practitioner is aware of their presence.

The first (and probably better-known) definition of centralization comes from the West: from New Zealand, in fact. We can thank Robin McKenzie, the world-renowned physical therapist, for this term that describes the receding of radiating symptoms from the periphery to the torso or central body. The converse term in the McKenzie system, in which the symptoms extend farther into the extremity, is known as peripheralization.

While peripheralization is considered a negative event, centralization of radicular-type symptoms is regarded as quite positive. In fact, symptom centralization frequently is one of the key initial goals that should be set in the early management of a case presenting with radiating symptoms. An increase in low back pain with a decrease in distal limb pain is far preferable to the opposite.

The great aspects of McKenzie's centralization description, and indeed his whole approach, are its practicality and simplicity. In fact, McKenzie himself states that his method is so simple, "I could teach a plumber to do it." Nevertheless, proper training in the McKenzie protocol as taught through many of our chiropractic schools is warranted if one wishes to safely and effectively utilize this method.

The second definition of centralization comes from the East: from central Europe to be more precise. I thank Professor Vladimir Janda of Charles University in Prague, Czech Republic for bringing this second definition to my attention. Professor Janda states that this phenomena is not originally his, but rather sprouted from various schools of thought around the world. However, for the sake of clarity, I will call it "Janda's centralization phenomenon" in order to separate it from that of McKenzie's.

The description of this second centralization phenomenon is a bit more complex than the first, but in my opinion is vitally important if we hope to better understand locomotor system function and dysfunction. The centralization phenomenon in this instance describes the neurophysiological occurrence associated with learning patterns in the locomotor system. At birth, each of us is "hard-wired" with a few inborn reflex movement patterns such as respiration, sucking and prehension

(e.g., bringing the hand to the mouth) of the extremities. We are each then given the challenge of learning to gain control of our maturing bodies so that we better adapt to our environment. Indeed, Janda states that with regard to the maturing locomotor system, "each of us is a self-made man or woman," because no one can truly assist us in this endeavor.

Our locomotor system matures as our afferent system brings information from the periphery in a centralizing manner; that is, from the various sensory nerves, along the axons to the dorsal root ganglia (DRG). The DRG has been called the brain at the segmental level because of its importance in local processing. Once the nerve impulse has been centralized to the DRG, it can then be forwarded to the higher level of the centralization process, the brain. Once there, integration and processing occurs which includes both learning and responses through our efferent system.

With repetition, learning and response becomes more embedded or automated. Such automated learned patterning occurs in gait, posture, and even handwriting. This is a rather simple explanation of the complex centralization process. Any further explanation diverts us from the intended direction of this article.

The point of this brief neurophysiology review is to simply appreciate the centralization phenomenon as it is described in this manner. In order to assess abnormal function (pathology), we have first covered normal function (physiology). We can now cover how a pathological centralization phenomenon, Prague style, can affect and complicate our patient care and form a base in early and long-term clinical goal setting.

When a patient sustains an injury (for instance, a sprained right ankle), the patient will instinctively alter posture and gait to reduce the loading to the injured area. Simply stated, this entails the locomotor system finding a new approach to ambulation that gains the most effective movement with the least nociceptive response from the ankle region.

The degree or severity of the limp is significantly dependent on this pain signal. The complex reassignment of muscular coordination and alternative joint loading then becomes the temporary normal movement pattern until the ankle heals. Once healed, we hope that the locomotor system reverts to its original movement patterns in static posture and gait. Unfortunately, the centralization phenomena can interfere with this return to normal gait.

To better understand the problem, we must return to our earlier scenario of the injured right ankle. Once the patient starts to alter gait, the motor system starts to learn the new movement patterns through the same centralization phenomenon that "taught" the original movements. Therefore, the longer one remains in an altered or compromised movement pattern, the greater chance that some or all of the newly learned motor remnants will remain as an unwelcome addition to the locomotor system.

How many patients have you seen with residual limps or postural compromises that were related to old injuries? How many times have you felt that the patient's poor posture or movements from an old injury were either a cause and/or complication of the current problem? If you have seen even one such case, then you can appreciate the centralization phenomenon of faulty locomotor learning.

How can this second centralization definition assist you in your clinical goal setting? Here are a few recommendations:

1. In acute cases, we must remember to maintain or restore normalized movements as soon as possible. We have all been taught the importance of early return to activity following injury to avoid the physical and psychological effects of deconditioning. We must also remember to

focus on directing the patient toward optimal posture and movement patterns to avoid a learned pathological centralized movement pattern.

2. For the chronic recurrent case, we must add an appropriate exercise or rehabilitative strategy designed to reduce pathological movement patterns that can cause recurrences or secondary injuries.

3. In each of the above cases, patient education of altered movement and posture is of vital importance. The more chronic their case, the greater the importance of their activities away from the office on your successful short- and long-term case resolution.

In an ironic twist, we may have a case in which we are attempting to promote a centralization phenomenon (McKenzie style) in an antalgic patient with radiating pain to a lower extremity while we try to avoid a centralization phenomenon (Prague style) for faulty locomotor patterning! Hence, the title given to this article.

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