[GUEST EDITORIAL]

How Spinal Manipulative Therapy Works: Why Ask Why?

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A patient with complaints of focal low back pain is evaluated by a physical therapist. The physical therapist notes no contraindications to the use of spinal manipulative therapy and applies an appropriately directed technique to the low back. Two days later this patient reports clinically meaningful decreases in both pain and disability. The patient asks the physical therapist why the spinal manipulative therapy worked.

What Should Be the Response?

For some patients, spinal manipulative therapy is an effective treatment for spine pain,[2,3,5] yet we really don't fully understand how or why. The mechanisms of spinal manipulative therapy are not well defined, and common explanations for why spinal manipulative therapy works lack supporting evidence. Traditionally, the decision to incorporate spinal manipulative therapy into a plan of care is based on a seductively plausible biomechanical theory. Examination techniques, sometimes quite elaborate in nature, are used to determine painful structures and associated abnormalities related to alignment and mobility. The appropriately matched spinal manipulative therapy treatment techniques are then implemented to correct "pathological" findings. For example, a vertebral segment with inadequate flexion may be "gapped."

The underlying implication of these approaches is that success of spinal manipulative therapy is dependent upon correction of biomechanical faults detected on examination. While these explanations are widely accepted, the current literature does not support their validity. For example, individual therapists cannot agree on a specific location requiring spinal manipulative therapy.[22] When applied, spinal manipulative therapy forces are not specific to intended location,[21] vary greatly from practitioner to practitioner,[18] despite similar therapeutic effects, and do not result in measurable changes in joint position.[23] Clinical studies suggest that successful outcome is not linked to specific spinal manipulative therapy techniques[5,17] or joint cavitation.[12] Rather, the recent clinical literature emphasizes the importance of identifying characteristics of individuals likely to respond favorably to spinal manipulative therapy.[3,5]

We are certainly not the first ones to notice this trend. The inconsistencies associated with identification and treatment of specific biomechanical dysfunction have resulted in the suggestion that practitioners "move it and move on."[10,11] Having done that, we are still left to wonder how and why spinal manipulative therapy works.

Competing explanations to biomechanical mechanisms must be considered. In our opinion, neurophysiological mechanisms may end up providing the most plausible explanations for the effectiveness of spinal manipulative therapy. A complete review of the literature on this topic is beyond our intended scope; but there is sufficient evidence to support this opinion. For instance, spinal manipulative therapy has been associated with increased afferent discharge,[6] motoneuron pool depression,[9] changes in motor activity, such as reflexive muscle activation[14] and decreased resting electromyographic signal intensity,[8] and reduction of

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pain perception in response to a standard stimulus.[13,24]

Collectively, these studies suggest that spinal manipulative therapy has a direct effect on the central nervous system. This means that clinical outcomes associated with spinal manipulative therapy may result from multiple neurophysiological mechanisms working alone or in combination. These include, but are not limited to, gating of nociception at the spinal cord due to stimulation of the mechanoreceptors,[19] direct stimulation of a spinal reflex to alter muscle activity,[15] or stimulation of pain centers in the brain.[25] Additionally, effectiveness of spinal manipulative therapy may be related to nonspecific neurophysiological effects, such as treatment expectation and placebo. Such effects are known to have a powerful influence on pain perception, and a recent study suggests that spinal manipulative therapy outcomes may be related to individual expectation for the provided intervention.[1]

There are some potential advantages of knowing more about mechanisms of spinal manipulative therapy. Spinal manipulative therapy is used less frequently by physical therapists than might be expected.[16] More information on how and why spinal manipulative therapy works may lead to higher utilization rates because there would be less skepticism about rationale for its effectiveness and less mysticism surrounding its use. Clinical prediction rules[3,4] that identify those likely to respond favorably to spinal manipulative therapy have been proposed. Such information is vital to improving clinical practice, and a better understanding of the mechanisms of spinal manipulative therapy may strengthen or expand existing clinical prediction rules. For example, if a placebo effect is associated with spinal manipulative therapy, the magnitude of the placebo effect can be explicitly altered by changing patient expectation and by conditioning to enhance the treatment effect.[20] Theoretically, the treatment effect of spinal manipulative therapy could be enhanced by informing patients that spinal manipulative therapy has been shown to have a powerful pain-relieving effect. Ultimately, knowledge of the means by which spinal manipulative therapy works would provide parallel ways for practitioners to continue to improve clinical outcomes.

Although we are skeptical that biomechanical models can solely explain the effectiveness of spinal manipulative therapy, we acknowledge that spinal manipulative therapy is applied to the patient through such forces. More precisely, neurophysiological responses are elicited in clinical settings by the biomechanical forces associated with spinal manipulative therapy. The literature is reflective of this potentially symbiotic relationship. A validated clinical prediction rule for spinal manipulative therapy includes lumbar hypomobility, along with several other less biomechanically oriented factors.[3] Additionally, it has been documented in an animal model that the degree of neurophysiological response may be dependent on the force of the vertebral translation associated with spinal manipulative therapy.[7]

Certain traditions persist, even those that lack an adequate basis for their continuation. The hockey playoff beard is a rite in which superstitious players attribute continued success to not shaving. From an objective perspective, attributing winning hockey games to continued facial hair growth is a ridiculous notion. However, certain players strictly adhere to this tradition. Physical therapists and others who routinely implement spinal manipulative therapy should become comfortable with the notion that spinal manipulative therapy does not have specific and lasting biomechanical effects, and that such effects alone are an inadequate explanation for effectiveness of spinal manipulative therapy. When the scientific literature is considered, attributing successful spinal manipulative therapy outcomes solely to the identification and correction of biomechanical faults makes as much sense as crediting a beard for winning a hockey playoff series.

So How Do We Appropriately Respond to the Previously Discussed Patient's Question of Why Spinal Manipulative Therapy Worked?

We suggest informing the patient that the spinal manipulative therapy caused transient and widespread forces to be absorbed through the treated area. These forces produced a barrage of input into the nervous system, evoking responses between the spinal cord and the cortex. A likely explanation for the successful outcomes achieved in this particular patient could be pain inhibition and changes in motoneuron pool activity, although nonspecific effects due to placebo and patient expectation could not be ruled out.

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