Tissue Damage Markers after a Spinal Manipulation in Healthy Subjects: A Preliminary Report of a Randomized Controlled Trial

Disease Markers
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KEY POINTS FROM THIS ARTICLE:

Thirty healthy subjects were randomly assigned to:
- A placebo spinal manipulation (control group; n = 10)
- A single lower cervical spinal manipulation (n = 10)
- A thoracic manipulation (n = 10)

Before and after intervention, each had their blood analyzed for 7 tissue injury biomarkers. "The detection of these proteins in serum and cerebrospinal fluid is a tell-tale of cell breakage produced by tissue damage."

Creatine phosphokinase (CPK) [*muscle injury*]

Lactate dehydrogenase (LDH) [*general tissue damage]*

C-reactive protein (CRP) [*systemic marker of inflammation and tissue damage*]

Troponin-I [*muscle injury*]

Myoglobin [*muscle injury*]

Neuron-specific enolase (NSE) [*neuronal damage*]

Aldolase [*general tissue damage]*

This is the first work that focused on the study of spinal manipulation and mechanically induced tissue damage through the analysis of damage biomarkers in blood samples. All the researchers were blinded to the therapist's intervention.

1) "Spinal manipulation is a common form of intervention used by a wide range of practitioners used to relieve pain and disability of the musculoskeletal system."

2) Spinal manipulation "presents benefits for patients such as an anti-inflammatory effect, pain relief, and reduction of drug consumption."

3) "The spinal manipulation is frequently defined as a manual procedure that involves a directed impulse to move a joint past its physiologic ROM without exceeding its anatomical limit."

4) "Spinal manipulation is a manual therapy technique frequently applied to treat musculoskeletal disorders because of its analgesic effects." It involves "a directed impulse to move a joint past its physiologic range of movement (ROM)."

5) "In this sense, to exceed the physiologic ROM of a joint could trigger tissue damage, which might represent an adverse effect associated with spinal manipulation. The present work tries to explore the presence of tissue damage associated with spinal manipulation through the damage markers analysis."

6) "Mild to moderate adverse effects occur in a large proportion of patients receiving spinal manipulation," and the majority of the adverse effects are transient and non-serious.

7) "Recent studies suggest that spinal manipulation may induce less arterial strain than the range of motion test when cervical rotation is examined."

8) The thoracic spinal manipulation technique involved a high-velocity, end-range, anterior-posterior force through the elbows to the middle thoracic spine in a supine position with patient's arms crossed. "There is no evidence of serious adverse events related to thoracic spinal manipulation."

9) The cervical manipulation was a high-velocity, midrange left rotational force to the lower cervical spine, supine, with left rotation and right side bending.

10) Control participants were treated following the cervical manipulation protocol with regard to hand contact, but without intention of mobilization, nor application of tissue tension by the treating clinician.

11) Muscle soreness following spinal manipulation should be "regarded as a minor, and expected, consequence of treatment."

12) "Most adverse events reported by manual therapy patients are thought to be benign and transient and are often unknown to the practitioner unless patients show observable signs (e.g., loss of motion or neurological deficits) or report pain or discomfort."

13) "A recent systematic review shows that nearly half of patients experience adverse events after manual therapy. These adverse events are short-lived and minor, and most will occur within 24 hours and resolve within 72 hours."

14) "Studies demonstrated that the mechanical load of the vertebral artery during spinal manipulation application was almost an order of magnitude lower than the strain required to cause its mechanical disruption."

15) These data agree with other works that show no alteration in pathologic blood vessels after a cervical manipulation.

16) "Syncope after spinal manipulative therapy is not related to tissue damage and that such adverse event may be explained by other reasons."

17) "After the analysis of seven tissue damage markers, our data do not show any significant differences in [their] concentrations."

18) "Neither cervical manipulation nor thoracic manipulation did produce significant changes in the CPK, LDH, CRP, troponin-I, myoglobin, NSE, or aldolase blood levels."

19) "Our data suggest that the mechanical strain produced by spinal manipulation seems to be innocuous to the joints and surrounding tissues in healthy subjects."

20) "Our data show no changes in any of the studied damage markers."

21) "Lower cervical and thoracic manipulative techniques seem to be safe manual therapies techniques which cause no harm to the health of the subject."

COMMENTS FROM DAN MURPHY

Insurance claims personnel, insurance medical examiners, and injury defense attorneys have on occasion accused me (or the treating chiropractor) of potentially injuring a patient with spinal adjusting. This article would do much to neutralize such arguments.