RAPID RESEARCH

September 2021

Inside This Week:
Spinal Manipulation

✅ Spinal Manipulations: Neurophysiological Effects

✅ Risk Associated with Spinal Manipulations
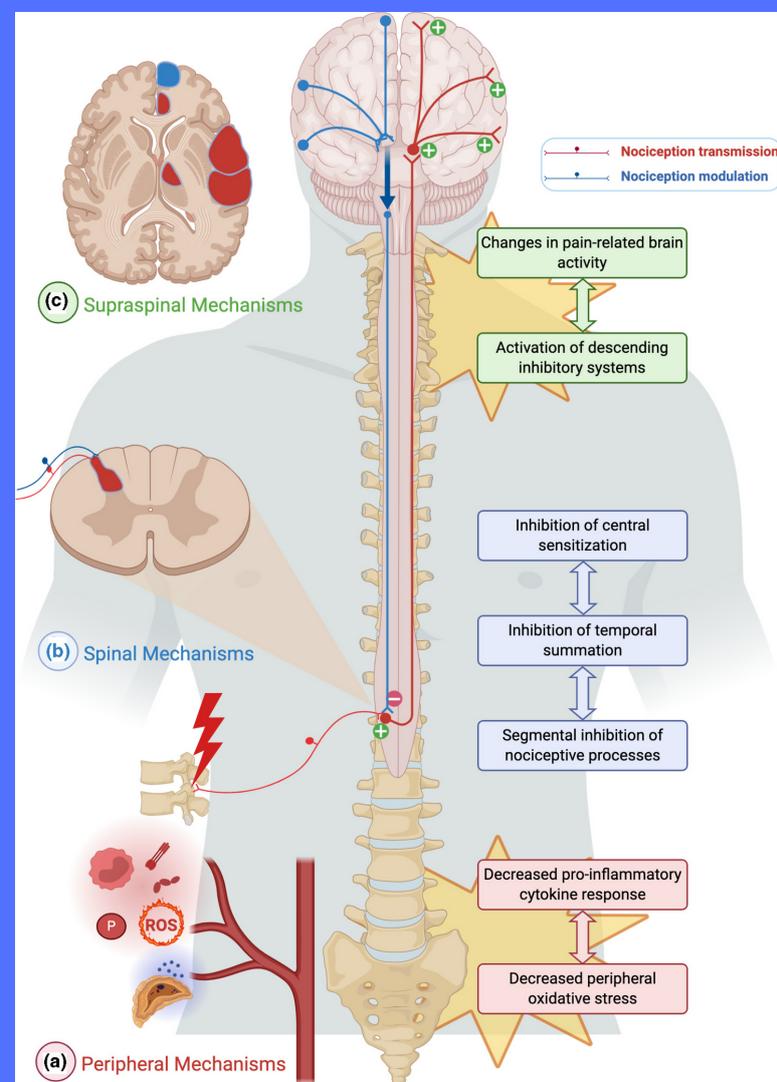
✅ Accuracy of Lumbar Spinal Manipulations

**Click for Full Text
(Gyer et al. 2019)**

SPINAL MANIPULATIONS: NEURO-PHYSIOLOGICAL EFFECTS

This research reviewed the relevance of various neurophysiological theories with respect to mechanistic studies that demonstrated neural responses following spinal manipulation.

- Nociception transmission
- Nociception modulation

(c) Supraspinal Mechanisms

Changes in pain-related brain activity

Activation of descending inhibitory systems

(b) Spinal Mechanisms

Inhibition of central sensitization

Inhibition of temporal summation

Segmental inhibition of nociceptive processes

Decreased pro-inflammatory cytokine response

Decreased peripheral oxidative stress

(a) Peripheral Mechanisms

KEY FINDINGS

Neuromuscular Effects:
Muscle Activation; Spinal manipulation results in neuromuscular responses, involves spinal reflex pathways and may reduce muscle hyperactivity, short-term.
Modulation of gamma motor neuron activity; spinal manipulation may attenuate stretch reflex hyperactivity and consequently reduce hyperexcitability of motor neurons.
Modulation of alpha motor neuron activity; Effects on H-reflexes and EMG amplitudes are short-lived and their mechanisms are unclear.

Autonomic responses:
ANS changes; spinal manipulation might lead to opioid independent analgesia, influencing the reflex neural outputs on the segmental and extra-segmental levels.
Supraspinal mechanisms; Manipulation can induce neural plastic changes in brain structures, such as, the cerebellum, basal ganglia, prefrontal cortex, primary sensory cortex and primary motor cortex.

Pain regulation is thought to happen through segmental, inhibition of descending pain inhibitory pathways, cerebal changes, and temporal summation.

MAIN TAKEAWAYS

So far, the exact mechanism through which spinal manipulation works **has not been established.**

Some **clear neurophysiological effects of spinal manipulation have been demonstrated**, including:
Central neuroplastic changes.
Alterations in motor neuron excitability.
Improved muscle strength.
Increase in cortical drive.
Activation of the descending pain modulation circuit.
Central sensitisation.

THE RISK ASSOCIATED WITH SPINAL MANIPULATIONS

Click for Full Text (Mai Neilson et al. 2017

This umbrella review elucidated and quantified the risk of serious adverse events (SAEs) associated with manipulations as spinal manipulative therapy (SMT) is a widely used manual treatment, but many reviews exist with conflicting conclusions about the safety of SMT.
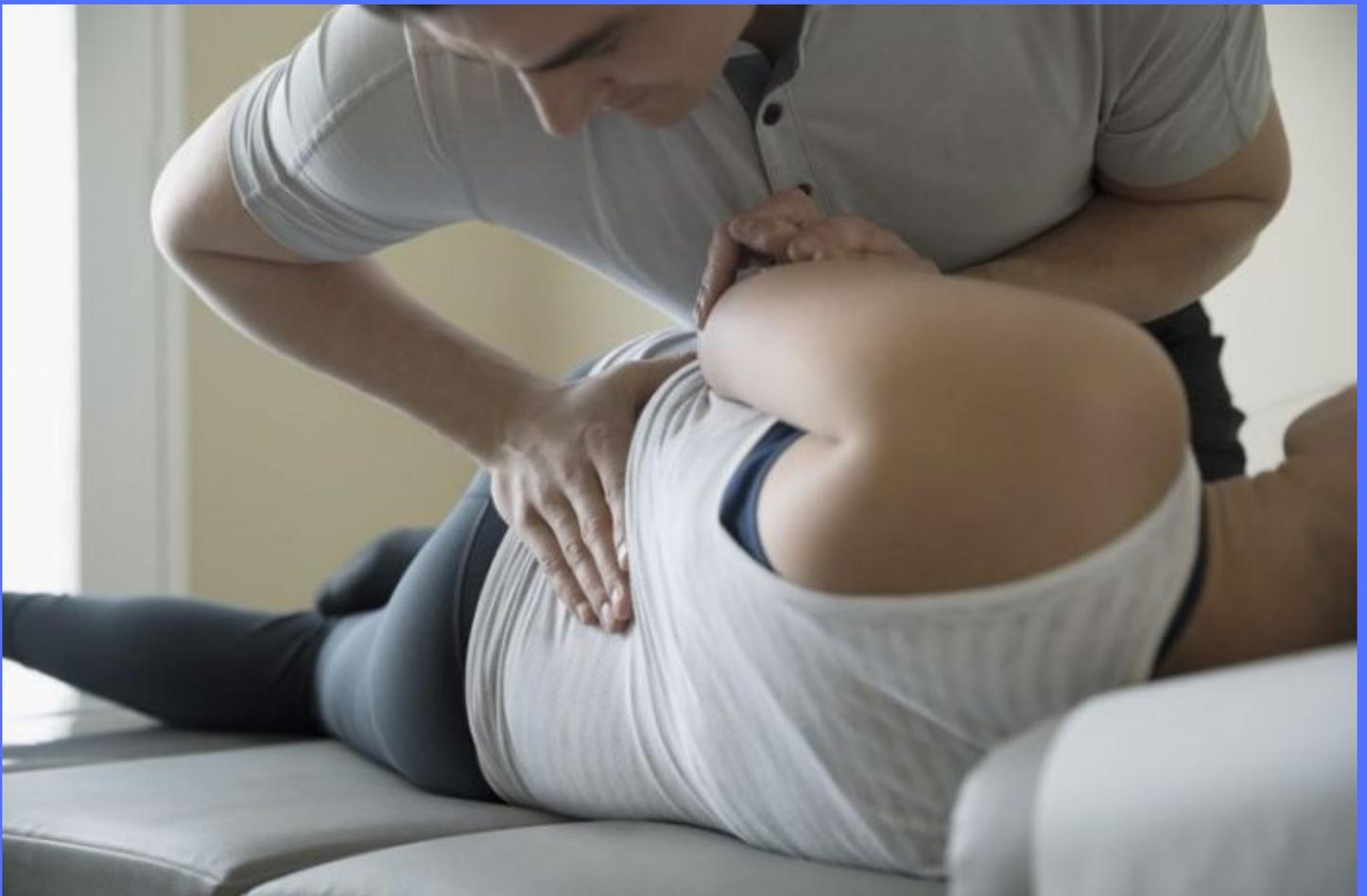
KEY FINDINGS

118 Systematic reviews inldued.

Estimates for the incidence of Serious Adverse Events (SAEs) ranged from 1 in 20,000 manipulations to 1 in 250,000,000 manipulations.

54 reviews (46%) expressed that SMT is safe.
15 (13%) expressed that SMT is harmful.
49 reviews (42%) were neutral or unclear regarding the safety of SMT.

The most frequently described adverse events (AEs) were:
Stroke (36)
Headache (34)
Vertebral artery dissection (29)

MAIN TAKEAWAYS

This overview demonstrated how extensive the literature on SMT is.

Majority of reviews are non-systematic and of **poor quality.**

Reviews with less methodological flaws typically communicated that SMT may be safe.

Research of high quality, with sufficient sample size and an appropriate comparison group is needed to obtain reliable risk estimates.

ACCURACY OF LUMBAR SPINAL MANIPULATIONS

This pilot study assessed the segmental specificity, or accuracy, of lumbar spinal manipulations

KEY FINDINGS

18 subjects received **2 manipulations**
2 subjects received **3 manipulations**
All performed by an experienced osteopath, totaling **42 manipulations, however 4 weren't recorded, totaling 38.**

Accelerometers were attached to the skin overlying the spinous processes of T12, L3 and S1, which were used to **triangulate the origin of the cavitation.**

16/38 recorded manipulations produced at least one cavitation

The rate of accuracy of the first adjustments was 3/9 (33%).
The accuracy rate in the second adjustment was 5/7 (71.4%).

8/16 adjustments (50%) were measured to be accurate to the intended target.

The mean error from target was 5.31 cm, or approximately one spinal segment.

The error occurred inferior to the intended target in 18 of 23 (78%) adjustments.

There was no relationship between target location and general cavitation location

MAIN TAKEAWAYS

Osteopathic techniques employed in this study **were not accurate in terms of direct treatment to specific motion segments** assessed to be pathologic.

The influence on neural variables **may not need segmental specificity to create a clinical effect.**

The **average error was 1 segment away,** which mimics the accuracy of chiropractic manipulations.

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We would greatly appreciate any feedback you have, as it helps us continually improve!

Leave Review