Neurophysiological Effects of Spinal Mobilization for Low Back Pain

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Introduction. Spinal mobilization (SM) is a common intervention for low back pain (LBP), but its neurophysiological mechanisms are not fully understood. This pilot study aims to explore the immediate neurophysiological effects of SM in individuals with LBP.

Methods. A randomized crossover design was used to assess the neurophysiological effects of SM in individuals with and without LBP. Participants (ages = 18-70) with no major spinal dysfunction received SM and light touch (sham SM) in random order. Pain intensity was measured on 0-10 Numeric Rating Pain Scale. Pain thresholds were evaluated with quantitative sensory testing (QST), including pressure pain threshold and conditioned pain modulation. Functional Near-Infrared Spectroscopy (fNIRS) was used to measure brain responses. QST and pain data were recorded at baseline and after each intervention.

Results. Nine participants (7 LBP, 54.2±14.5 years old and 2 healthy controls, 43±14.1 years old) were included. In LBP participants, baseline pain score of 2.8±.44 increased to 3.8±1.5 and 3.8±.84 after sham and SM interventions respectively. No significant changes in PPT were observed in both LBP and healthy controls. fNIRS analysis showed significantly ($p < 0.05$) decreased blood flow/activity in right motor, left dorsolateral prefrontal, and right and left posteromedial cortices during SM compared to sham treatment.

Conclusions. While no significant changes were observed in QST, SM led to reduced brain activity in several key regions of pain modulation, suggesting real-time and immediate neurophysiological responses. Unexpected increase in self-reported pain intensity may be due to discomfort with repeated testing or actual increase of pain perception.

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