

Using Osteopathic Manipulative Therapy to Influence Autonomic Nervous System Activity

Ruffini N, D'Alessandro G, Mariani N, Pollastrelli A, Cardinali L, Cerritelli F. Variations of high frequency parameter of heart rate variability following osteopathic manipulative treatment in healthy subjects compared to control group and sham therapy: randomized control trial. *Front Neurosci*. 2015;9:272. doi:10.3389/fnins.2015.00272.

The relationship between manipulative techniques and heart rate variability (HRV) as a measure of autonomic nervous system balance has been reported in the literature.¹⁻⁴ Researchers in Italy conducted a pragmatic, randomized, single-blinded, placebo-controlled crossover study to further examine the effects of osteopathic manipulative therapy (OMTh; manipulative care provided by foreign-trained osteopaths) on HRV.

Sixty-six participants (mean [SD] age, 26.7 [8.4] years; mean [SD] body mass index, 18.5 [4.8]) were randomly allocated to 1 of 3 groups. Groups A and B received both OMTh and sham therapy at different times. Group C was the control group, with no therapy administered. Exclusion criteria included pregnancy, menopause, menstruation during the session, chronic pain, pathologic condition, alcohol use in the past 48 hours, medication or drug use in the past 72 hours, use of orthotics within the past 3 months, surgical interventions, and OMTh in the past 3 months.

Each group was subjected to two 25-minute sessions. Four osteopaths, who were blinded to the study design and outcome data, administered OMTh. Therapy was based on patient evaluation and was limited to balanced ligamentous tension, balanced membranous tension, and craniosacral techniques. Heart rate variability was measured using electrocardiography before, during, and after treatment. Primary outcome measures included HRV as high frequency (HF) expressed in normalized units ($_{nu}$ HF), an indirect measurement of the parasympathetic activity. Secondary outcome measures included low frequency (LF) in absolute units ($_{au}$ LF), LF/HF ratio, detrended fluctuation scaling exponent (DFA α 1), and

$_{au}$ HF. Detrended fluctuation analysis, a statistical method for nonlinear analysis, is a more sensitive measurement of parasympathetic activity.⁵

The OMTh group had a statistically significant increase in $_{nu}$ HF values compared with the sham group ($P<.01$) and the control group ($P<.001$), whereas sham therapy did not show any significant change in $_{nu}$ HF compared with the control group ($P=.44$). Both $_{au}$ LF and LF/HF ratio were significantly decreased in the OMTh group compared with the sham ($P<.05$ and $P<.001$, respectively) and the control ($P<.001$ for both outcomes) groups; OMTh also showed a reduction of DFA α 1 ($P<.05$).

The findings suggest that OMTh influences the autonomic nervous system by increasing parasympathetic activity and decreasing sympathetic activity. Using a pragmatic protocol improves external validity. However, the mechanisms by which OMTh causes these effects is still unknown. (doi:10.7556/jaoa.2016.011)

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