Peripheral Skin Blood Flow Changes Following Different Controlled Cervical Osteopathic Mobilizations: A Pilot Study

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Background: Modulating peripheral sympathetic nervous system (pSNS) function may be a mechanism by which osteopathic manipulative treatment (OMT) impacts numerous disorders, particularly visceral disorders and possibly peripheral skin blood flow (pSkBF). Increased pSkBF has been associated with a hypoalgesic effect on musculoskeletal pain following different therapeutic modalities. Published outcomes on pSkBF changes following OMT are scarce, have not considered a dose-related effect, and have conflicting results although OMT is usually associated with a short-term sympathoexcitatory effect.

Objective: To investigate short-term dose-response effects of non-noxious pressures via standardized OMT applied on the cervico-thoracic junction on pSkBF changes in the upper limbs and on pulse rate variability (PRV), an indirect measurement of pSNS function.

Methods: This project was approved by our institutional review board. The proposed methodology recorded and analyzed pSkBF and PRV data without motion artifacts as in previously published studies. We used a cross-over design on 4 asymptomatic participants who underwent 4 different procedures on 4 different days: control (no touch), placebo (touch), low-pressure OMT, and high-pressure OMT. The OMT was the same cervical mobilization applied rhythmically with different non-noxious pressures. Using a Biopac MP36 system, we collected pSkBF data as percent changes from baseline and PRV data as the low to high frequency ratio of PRV spectra (LF/HF). Pressure data (kPa) were recorded with a Novel Pliance-X system.

Results: Our pilot data revealed a positive, although non-significant, relationship between normalized pSkBF and raw kPa, but the same OMT was associated with a decrease or increase in pSkBF. The PRV data had no clear pattern. However, we observed opposite changes in the LF/HF ratios following low-pressure and high-pressure OMT.

Conclusion: Meaningful pSkBF, PRV, and pressure data were collected in this study. Although not significant, our data may suggest opposite short-term changes in pSkBF and the LF/HF ratio depending on the amount of non-noxious pressure used to perform the same OMT. A larger sample may provide more data to specifically address these trends.

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