

The effects of lumbar spine high velocity low amplitude thrust (HVLAT) manipulation on upper limb cutaneous blood supply

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Introduction: Spinal manipulation is commonly employed by osteopaths to correct somatic and visceral dysfunction. Much research has concentrated on the somatovisceral effects of spinal manipulation, with many studies demonstrating sympathoexcitation/inhibition following spinal manipulation. The mechanisms behind the neurophysiological effects of spinal manipulation still remains poorly understood. No published study to date has investigated the effect of spinal manipulation on the sympathetic innervation of regions of the body with no known neural connections. Previous studies that used cutaneous blood flow (CBF) as measures of sympathetic activity have not considered the contribution that breathing or postural perturbation have on study outcomes. The aim of this study was to investigate the effect a unilateral lumbosacral HVLAT on CBF to the upper limb, and to estimate the contribution that breathing or postural perturbation may have on the study outcome.

Design: The study was a strictly controlled, carry-over design on a cohort of twenty-eight asymptomatic, male osteopathic students of similar age and body mass index.

Methods: CBF to the distal, palmar surface of the both forearms was measured using Laser Doppler Flowmetry (LDF). After 10-minute acclimatising period, each subject acted as their own control whilst an initial 5-minute baseline measurement of CBF was established. This was followed directly by the first control, postural perturbation for the HVLAT in right rotation, and a further 5-minute 'post-control 1' recording phase. This was then followed directly by the second control, postural perturbation for the HVLAT in right rotation and breathing relaxation, and a further 5-minute 'post-control 2' recording phase. The experimental intervention (HVLAT to L5-S1) was then applied, and followed by a further 5-minute 'post-experimental intervention' recording of CBF.

Results: All raw data for the different interventions were converted into percentiles relative to the baseline reading so the data could be analysed by a one way ANOVA and post-hoc Tukey's tests. The results indicated that there was a significant change in CBF from baseline level to the experimental intervention ($p < 0.02$), but no significant effect as a result of postural perturbation or breathing on sympathetic activity. The results indicated that the change in CBF was side specific, being significant on the ipsilateral side ($p < 0.02$) of the HVLAT, while no significance was recorded on the contralateral side ($p > 0.05$). However, the results illustrate the contribution that postural perturbation and especially breathing have on the outcome of this study which was calculated to be 4.2% and 7.5%, and 48% and 65%, respectively for the contralateral and ipsilateral upper limb respectively.

Conclusion: This study provides preliminary evidence that a unilaterally applied HVLAT to the right L5/S1 lumbar zygo-apophyseal joint results in side-specific peripheral changes in the upper limbs. However, there is also preliminary evidence in this study that the breathing relaxation technique used in HVLAT's contributes to the magnitude of the outcome as assessed by changes in CBF. It is concluded that the breathing effect should be included in interpreting past studies and in the design of future studies.

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Influence of a mobilization of the mesentery on the hepatic portal vein capacity measured with doppler echo

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Introduction: Visceral manipulations are widely used among osteopaths, although knowledge regarding the absolute physiological effects has not been clearly established. In this study we evaluated the physiological changes after a manual intervention of a visceral structure in the abdominal cavity: more precisely, we studied the effect of a mobilization of the mesentery on the capacity of the portal vein.

Design: Patient- and evaluator-blinded, randomized, experimental study.

Methods: A group of 30 volunteers (age 20–45), selected according to specific inclusion criteria, were randomly assigned to a mobilization-technique group (MT) and a non-specific-technique group (NST). On the 15 volunteers in the MT group a mobilization of the mesentery relative to its root was performed, while the 15 volunteers in the NST group received a stretching of the iliopsoas muscle. During the experiment three measurements were performed, one before the MT or NST manipulation, one immediately after having applied the technique and one 60 minutes later.

At each time the diameter, the blood flow velocity and the capacity of the portal vein were determined using an echo-Doppler (ATL Philips, HDI 5000, Bothell, USA).

Results: The mean portal flow of both groups before interference was 755,71 ml/min; SD = 176,57 (NST group) and 764,38; SD = 359,53 (MT group), immediately after intervention 878,05 ml/min; SD = 227,07 (NST group) and 1079,04 ml/min; SD = 374,24 (MT group). \pm 1 hour after intervention, the mean portal flow was 751,51 ml/min; SD = 246,40 (NST group) and 1039,87 ml/min; SD = 281,43 (MT group).

Conclusion: A multivariate analysis shows a significant ($F(1,28) = 4,726$; $p = 0,038$) higher capacity in the portal vein after mobilization of the mesentery. This study supports the hypothesis that manipulation of visceral organs in the abdominal cavity has a physiological effect. Further studies will be needed to confirm the outcome of this study, and more knowledge is needed regarding the specific mechanisms that are involved with visceral manipulation.

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Test-dependent osteopathic treatment of somatoform autonomic dysfunction of the cardiovascular system: A pre-post pilot trial

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Objective: Functional cardiovascular dysfunctions are among the most common complaints, with patients often reporting strong cardiovascular symptoms even though no apparent organic problems can be diagnosed in medical examinations.

Design: A two phase (pre-post) pilot intervention study was carried out to address the question of whether a series of test-dependent osteopathic treatment of patients with somatoform autonomic dysfunctions of the cardiovascular system (CFD) may improve their symptoms.

Materials and methods: Thirty patients aged between 20 and 50 years reporting symptoms of CFD but without any manifest problem requiring treatment by a cardiologist were enrolled into the study. In phase one patients received no treatment for six weeks, in phase two patients received three test-dependent osteopathic treatments at intervals of two weeks. Primary outcome parameters were the patients' self-evaluation of their physical symptoms and changes in those symptoms as measured with the SOMS questionnaire (Screening for Somatoform Symptoms). Secondary outcome parameters were intensity of the pain (assessed by means of a visual analogue scale) and frequency of occurrence. Changes occurring in the two phases were compared statistically.

Results: A direct comparison between the untreated period and the treatment period revealed clinically relevant improvements in the osteopathic treatment period for the main outcome parameter SOMS. Depending on the evaluation method, the SMOS scores ranged from 17.9 to 10.1 (95% CI=5.2 to 10.4, $p < 0,001$ for the SOMS-BA score), respectively from 35.8 to 14.6 (95% CI=13.3 to 28.6, $p < 0,001$ for the SOMS-INT score). Intensity of the pain decreased from 74 to 19 on the VAS (95% CI=44.5 to 64.8, $p < 0,001$) and the frequency of occurrence in the last fourteen days decreased from 3.7 to 1.9 (95% CI=1.52 to 2.12, $p < 0,001$), equivalent to an improvement of 74% and 48%.

Conclusion: A series of three osteopathic treatments over a period of six weeks were accompanied by clinically relevant positive changes of symptoms of CFD. Based on these preliminary findings, rigorous randomised controlled studies are warranted, and the sustainability of the successful treatment should be monitored in a follow-up study.

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