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• Research Article

Heart rate variability and the influence of craniosacral therapy on autonomous nervous system regulation in persons with subjective discomforts: a pilot study

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BACKGROUND: Subjective discomforts in a preclinical range are often due to imbalanced autonomic nervous system activity, which is a focus of craniosacral therapy.

OBJECTIVE: The aim of this work was to determine any changes in heart rate variability (HRV) in a study on craniosacral therapy.

DESIGN, SETTING, PARTICIPANTS AND INTERVENTIONS: This is a quasi-experimental (controlled) study with cross-over design. In a private practice, measurements were performed on 31 patients with subjective discomforts before and after a control and an intervention period. HRV was determined using a device that requires a measuring time of 140 s and electrode contact only with the fingertips.

Main PRIMARY OUTCOME MEASURES: HRV change under the influence of a defined one-time intervention (test intervention) with craniosacral therapy versus control (defined rest period).

RESULTS: Standard deviation of all RR-intervals (ms) and total power of RR-interval variability in the frequency range (ms²) were together interpreted as an indicator of test subjects' autonomic nervous activity and as a measure of their ability to cope with demands on their health. Neither of these parameters increased during the control period ($P > 0.05$), whereas during the test intervention period there was an increase in both ($P < 0.05$, $P < 0.01$). Nevertheless, interactions between treatment and the increase were statistically not significant ($P > 0.05$). No changes were observed in the low frequency/high frequency ratio (sympathetic-vagal balance) in the course of the control or the test intervention period ($P > 0.05$).

CONCLUSION: Craniosacral treatment had a favourable effect on autonomic nervous activity. This in itself is an interesting result, but further research will be needed to distinguish specific effects of craniosacral therapy technique from less specific therapist-client interaction effects.

KEYWORDS: massage; autonomic nervous system; electrocardiography; adult; complementary therapies; pilot projects

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1 Introduction

Craniosacral therapy (CST) is a non-invasive method, derived from osteopathy, developed in the 1970s by J. Upledger, MD^[1]. It is based on the assumption that there is a fine rhythmic movement, which pervades the body and can be discerned by practised therapists under their palpating hands. This movement can be utilised for diagnostic as well as therapeutic purposes by regulating the flow of cerebrospinal fluid^[2,3]. The focus of craniosacral examination and treatment lies on the craniosacral structures; these include the bones and connective tissues (membranes of the brain and spinal cord) of the skull and spine and the cerebrospinal fluid. Anatomically surrounding and physiologically sustaining the central nervous system, these structures have a direct influence on functioning of the autonomic nervous system^[2,4]. The effects which can be brought about through CST are achieved through gentle touch in the areas of the skull, face, spine and pelvis^[5]. Treatment is not primarily aimed at symptoms, but determined by priorities established by the therapist during each patient examination^[2].

Studies on the use of CST to treat migraine^[6], fibromyalgia^[7,8] and asthma^[9] showed encouraging results. In a review performed by Jaekel and von Hauenschild^[10], positive clinical outcomes were reported for pain reduction and improvement in general well-being of patients in randomized clinical trials; as the quality of other trials was low, the authors stated that currently available evidence was insufficient to draw definite conclusions on the general efficacy of this treatment modality. A review by Ernst^[11] was less optimistic, and concluded that “the notion that CST is associated with more than non-specific effects is not based on evidence from rigorous randomized clinical trials”.

Working from the observation that changes in autonomic balance are one of the fundamental causes of bodily discomforts, the question of whether CST has a harmonizing influence on the regulation of autonomic nervous processes has been raised. Heart rate variability (HRV) is a non-invasively measurable indicator of such processes, which has been used for diagnostic purposes since the mid-1960s. Its range of application extends from obstetrics to stress and regeneration research as well as sports. Determination of HRV is regarded as a method of assessing health and coping status^[12]. It is therefore also used in therapy evaluation^[13-18]. A randomized controlled trial showed positive effects of CST on sensitive, tender points and HRV in patients with fibromyalgia^[8]. To date there have been no studies on the effects of CST on the regulation of the autonomic nervous system in subjects with subjective discomforts but without clinical diagnosis.

The following research questions were pursued in this

study: does HRV change under the influence of a defined rest period (control rest)? does HRV change under the influence of a defined one-time intervention (test intervention)? are there differences between treatment periods?

2 Materials and methods

2.1 Design

This pilot study was a quasi-experimental (controlled) study with cross-over design. The design and methods of the study were approved by the ethics committee of the Interuniversity College, Graz, Austria. Informed written consent was obtained from each participant, and all data were made anonymous before analysis.

2.2 Test subjects

Thirty-one volunteers (16 females, 15 males, average age 46.2 years) were enrolled on the basis of the following inclusion criteria: age 19-60 years; subjective discomforts such as prolonged sleep latency, feeling stressed, nervous, weak or restless as found typical for patients of complementary therapy practices in Switzerland^[19]. These symptoms are typical of persons seen by a craniosacral therapist, their prime motive for seeking treatment being more often a lack of feeling completely healthy than a clinically diagnosed disease.

The following were exclusion criteria: cardiovascular disease; pacemaker; diabetes with neural involvement; acute infection; medication with β -blockers, antidepressants, psychotropic drugs, atropine or phenylephrine. There were no dropouts. All volunteers included in the study completed all pre- and post-measurements.

2.3 Treatment allocation

The study was carried out in a practice for CST in Zurich, Switzerland. Each test subject was given two appointments, each between 10 am and 11 am on two consecutive days. Upon their arrival on day 1, test subjects were randomly assigned by dice either to a 30-minute session (intervention period) or to a 30-minute control rest period for that day (t1). Each patient was assigned to the other of the two alternatives for the following day (t2) (Figure 1). In both cases they underwent a 10-minute rest period of sitting prior to the first measurement (t1_1 or t2_1, see below). The study was carried out as an open study, *i.e.*, neither participants nor therapist were blinded to group assignment.

2.4 Intervention and control rest

A trained Swiss craniosacral therapist, with 20 years of professional experience, gave 30-minute sessions in CST following the 10-step protocol developed by Upledger *et al*^[5], proceeding in each case according to her observations in the individual subject. The treatment involved gentle touch of different parts of the fully clothed patient's body with the intent of resolving structural or energy restrictions. This included techniques on the patient's feet, sacrum,

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