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Benefits of Craniosacral Therapy in Patients with Chronic Low Back Pain: A Randomized Controlled Trial

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Abstract

Objectives: To evaluate the effects of craniosacral therapy on disability, pain intensity, quality of life, and mobility in patients with low back pain.
Design: A single-blinded randomized controlled trial.
Patients: Sixty-four patients with chronic nonspecific low back pain (mean age ± SD, 50 ± 12 years; 66% female) who were referred for physical therapy at a clinical unit of the Health Science School of the University of Almeria (Spain).
Interventions: Participants were randomly assigned to an experimental group (10 sessions of craniosacral therapy) or a control group (10 sessions of classic massage).
Outcome measures: Disability (Roland Morris Disability Questionnaire [RMQ, primary outcome] and Oswestry Disability Index), pain intensity (10-point numeric pain rating scale), kinesiophobia (Tampa Scale of Kinesiophobia), isometric endurance of trunk flexor muscles (McQuade test), lumbar mobility in flexion, hemoglobin oxygen saturation, systolic blood pressure, diastolic blood pressure, hemodynamic measures (cardiac index), and biochemical estimation of interstitial fluid. These outcomes were registered at baseline, after treatment, and 1-month follow-up.
Results: No statistically significant differences were seen between groups for the main outcome of the study, the RMQ ($p = 0.060$). However, patients receiving craniosacral therapy experienced greater improvement in pain intensity ($p \leq 0.008$), hemoglobin oxygen saturation ($p \leq 0.028$), and systolic blood pressure ($p \leq 0.029$) at immediate- and medium-term and serum potassium ($p = 0.023$) level and magnesium ($p = 0.012$) at short-term than those receiving classic massage.
Conclusions: Ten sessions of craniosacral therapy resulted in a statistically greater improvement in pain intensity, hemoglobin oxygen saturation, systolic blood pressure, serum potassium, and magnesium level than did 10 sessions of classic massage in patients with low back pain.

Introduction

Low back pain (LBP) places the greatest burden on society.[1] LBP is common in the general adult population in Europe, North America, and Australia.[2] This condition leads to marked limitations in activity and affects the level of disability experienced by the patient. With the recognition that the chronicity of the condition has several determinants, multidisciplinary management of patients with persistent, invalidating LBP has now been widely adopted.[3,4]

Craniosacral therapy is an alternative and complementary therapy based on the theory that restricted movement at the cranial sutures of the skull negatively affect rhythmic impulses conveyed through the cerebral spinal fluid from the cranium to the sacrum.[5,6] Restriction within the craniosacral system can affect its components: the brain, spinal cord, and protective membranes. The brain is said to produce involuntary, rhythmic movements within the skull. This movement involves dilation and contraction of the ventricles of the brain, which produce the circulation of the cerebral spinal fluid.[5,6]

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Utility of craniosacral therapy in treatment of patients with non-specific low back pain. Preliminary report

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Abstract

Background: Non-specific low back pain is an increasingly common musculoskeletal ailment. The aim of this study was to examine the utility of craniosacral therapy techniques in the treatment of patients with lumbosacral spine overload and to compare its effectiveness to that of trigger point therapy, which is a recognised therapeutic approach.

Material and methods: The study enrolled 55 randomly selected patients (aged 24-47 years) with low back pain due to overload. Other causes of this condition in the patients were ruled out. The participants were again randomly assigned to two groups: patients treated with craniosacral therapy (G-CST) and patients treated with trigger point therapy (G-TPT). Multiple aspects of the effectiveness of both therapies were evaluated with the use of: an analogue scale for pain (VAS) and a modified Laitinen questionnaire, the Schober test and surface electromyography of the multifidus muscle. The statistical analysis of the outcomes was based on the basic statistics, the Mann-Whitney U test and Wilcoxon's signed rank test. The statistical significance level was set at $p \leq 0.05$.

Results: Both groups demonstrated a significant reduction of pain measured with the VAS scale and the Laitinen questionnaire. Moreover, the resting bioelectric activity of the multifidus muscle decreased significantly in the G-CST group. The groups did not differ significantly with regard to the study parameters.

Conclusions: 1. Craniosacral therapy and trigger point therapy may effectively reduce the intensity and frequency of pain in patients with non-specific low back pain. 2. Craniosacral therapy, unlike trigger point therapy, reduces the resting tension of the multifidus muscle in patients with non-specific lumbosacral pain. The mechanism of these changes requires further research. 3. Craniosacral therapy and trigger point therapy may be clinically effective in the treatment of patients with non-specific lumbosacral spine pain. 4. The present findings represent a basis for conducting further and prospective studies of larger and randomized samples.

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AOGS MAIN RESEARCH ARTICLE

Effects of craniosacral therapy as adjunct to standard treatment for pelvic girdle pain in pregnant women: a multicenter, single blind, randomized controlled trial

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Key words
Complementary medicine, alternative medicine, craniosacral therapy, pregnancy, pelvic girdle pain, randomized controlled trial

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Conflict of interest
All authors declare they had no support from any organization for the submitted work; no financial relation with any organizations that might have an interest in the submitted work in the previous 3 years; and no other relations or activities that could appear to have influenced the submitted work.

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Abstract

Objective. Pelvic girdle pain (PGP) is a disabling condition affecting 30% of pregnant women. The aim of this study was to investigate the efficacy of craniosacral therapy as an adjunct to standard treatment compared with standard treatment alone for PGP during pregnancy. *Design.* Randomized, multicenter, single blind, controlled trial. *Setting.* University hospital, a private clinic and 26 maternity care centers in Gothenburg, Sweden. *Population.* A total of 123 pregnant women with PGP. *Methods.* Participants were randomly assigned to standard treatment (control group, $n = 60$) or standard treatment plus craniosacral therapy (intervention group, $n = 63$). *Main outcome measures.* Primary outcome measures: pain intensity (visual analog scale 0–100 mm) and sick leave. Secondary outcomes: function (Oswestry Disability Index), health-related quality of life (European Quality of Life measure), unpleasantness of pain (visual analog scale), and assessment of the severity of PGP by an independent examiner. *Results.* Between-group differences for morning pain, symptom-free women and function in the last treatment week were in favor of the intervention group. Visual analog scale median was 27 mm (95% confidence interval 24.6–35.9) vs. 35 mm (95% confidence interval 33.5–45.7) ($p = 0.017$) and the function disability index was 40 (range 34–46) vs. 48 (range 40–56) ($p = 0.016$). *Conclusions.* Lower morning pain intensity and less deteriorated function was seen after craniosacral therapy in conjunction with standard treatment compared with standard treatment alone, but no effects regarding evening pain and sick-leave. Treatment effects were small and clinically questionable and conclusions should be drawn carefully. Further studies are warranted before recommending craniosacral therapy for PGP.

Abbreviations: ODI, Oswestry Disability Index; PGP, pelvic girdle pain; VAS, Visual Analog Scale.

Key Message

Significantly lower morning pain intensity and less functional deterioration was noted after craniosacral therapy provided in conjunction with standard treatment compared with standard treatment alone. There were no effects regarding evening pain and sick-leave. Treatment effects are small and clinically questionable and craniosacral therapy cannot be recommended for pelvic girdle pain in pregnancy.

Introduction

Pelvic girdle pain (PGP) is a condition affecting up to 30% of pregnant women (1,2). It causes pain, dysfunction, reduced health-related quality of life (2) and is one of the most common causes of sick leave during pregnancy (3). The risk for PGP in pregnancy is increased

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Original Article

Effect of craniosacral therapy on the intensity of chronic back pain of nurses: A randomized controlled trial

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ABSTRACT

Background & Aim: Chronic low back pain is a common disease among nurses. According to the literature, complementary medicine can reduce low back pain, one of which is craniosacral therapy. This study was designed to investigate the effect of craniosacral therapy on the intensity of chronic back pain of nurses.
Methods & Materials: This randomized clinical trial study was conducted on 60 nurses with chronic back pain. The participants were randomly assigned into intervention and control groups. The intervention group's participants received eight individual sessions of craniosacral therapy. In the control group, a light-touch in the lumbar region was performed as a placebo. The therapist met each participant separately in a private room of the hospital. The two groups completed the McGill Pain Questionnaire at the baseline, immediately after the intervention, and one month after the intervention. The collected data was analyzed in SPSS (v.16) using descriptive and analytical tests such as t-test, Chi-Square, ANCOVA, and repeated measures ANOVA.
Results: The ANCOVA test results showed a significant difference between the two groups' mean scores of pain intensity and its subscales ($P<0.05$). The results of repeated measures ANOVA showed that the mean scores of pain intensity and its subscales (sensory, affective, pain evaluation, and miscellaneous) decreased over the three time points in the intervention group ($P<0.05$).
Conclusion: The findings affirmed the positive effects of the craniosacral therapy on the intensity of pain in nurses with chronic back pain. Therefore, it is recommended that this approach be performed as a complementary, effective, non-invasive intervention to decrease chronic back pain.

Introduction

Chronic back pain is one of the most challenging medical problems in industrialized and developing countries that, with a high prevalence, imposes high economic costs on the community (1). In general, the annual prevalence of back pain in nurses ranges from 15 to 45% (2). 75 to 85 percent of people experience some back pain during their lifetime (1). The prevalence of back pain in the United States is between 15% and 20%, 25 to 45% in Europe (3), 28.5% in Canada (4), and 65-70% in Iran, which is significant statistics (5). Back pain is the most common musculoskeletal disorder in the working population, while about one-third referred to orthopedic clinics is due to non-specific disorders. The group of patients, experiences pain between the twelve ribs and the Gluteal region in the back. They refer to the physician with a history of pain for more than three months without any pathological symptoms (6). Chronic back pain is the most important reason for work absence and job disability, and its financial cost is three times more than that of cancer (7). The risk of

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Effect of mindfulness-based mind-body therapies in patients with non-specific low back pain—A network meta-analysis of randomized controlled trials

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Background/objectives: Although mindfulness-based mind-body therapy (MBMBT) is an effective non-surgical treatment for patients with non-specific low back pain (NLBP), the best MBMBT mode of treatment for NLBP patients has not been identified. Therefore, a network meta-analysis (NMA) was conducted to compare the effects of different MBMBTs in the treatment of NLBP patients.

Methods: PubMed, EMBASE, Cochrane Central Register of Controlled Trials, and Web of Science databases were searched for randomized controlled trials (RCTs) applying MBMBT for the treatment of NLBP patients, with all of the searches ranging from the time of database creation to January 2023. After 2 researchers independently screened the literature, extracted information, and evaluated the risks of biases in the included studies, the data were analyzed by using Stata 16.0 software.

Results: A total of 46 RCTs were included, including 3,886 NLBP patients and 9 MBMBT (Yoga, Ayurvedic Massage, Pilates, Craniosacral Therapy, Meditation, Meditation + Yoga, Qigong, Tai Chi, and Dance). The results of the NMA showed that Craniosacral Therapy [surface under the cumulative ranking (SUCRA): 99.2 and 99.5%] ranked the highest in terms of improving pain and disability, followed by Other Manipulations (SUCRA: 80.6 and 90.8%) and Pilates (SUCRA: 54.5 and 71.2%). In terms of improving physical health, Craniosacral Therapy (SUCRA: 100%) ranked the highest, followed by Pilates (SUCRA: 72.3%) and Meditation (SUCRA: 55.9%). In terms of improving mental health, Craniosacral Therapy (SUCRA: 100%) ranked the highest, followed by Meditation (SUCRA: 70.7%) and Pilates (SUCRA: 63.2%). However, in terms of improving pain, physical health, and mental health, Usual Care (SUCRA: 7.0, 14.2, and 11.8%, respectively) ranked lowest. Moreover, in terms of improving disability, Dance (SUCRA: 11.3%) ranked lowest.

Conclusion: This NMA shows that Craniosacral Therapy may be the most effective MBMBT in treating NLBP patients and deserves to be promoted for clinical use.

Systematic review registration: https://www.crd.york.ac.uk/PROSPERO/, PROSPERO [CRD42023389369].

KEYWORDS

mindfulness, mind-body therapies, non-operative therapy, non-specific low back pain, network meta-analysis

OPEN

Craniosacral Therapy for the Treatment of Chronic Neck Pain

A Randomized Sham-controlled Trial

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Objectives: With growing evidence for the effectiveness of craniosacral therapy (CST) for pain management, the efficacy of CST remains unclear. This study therefore aimed at investigating CST in comparison with sham treatment in chronic nonspecific neck pain patients.

Materials and Methods: A total of 54 blinded patients were randomized into either 8 weekly units of CST or light-touch sham treatment. Outcomes were assessed before and after treatment (week 8) and again 3 months later (week 20). The primary outcome was the pain intensity on a visual analog scale at week 8; secondary outcomes included pain on movement, pressure pain sensitivity, functional disability, health-related quality of life, well-being, anxiety, depression, stress perception, pain acceptance, body awareness, patients' global impression of improvement, and safety.

Results: In comparison with sham, CST patients reported significant and clinically relevant effects on pain intensity at week 8 (−21 mm group difference; 95% confidence interval, −32.6 to −9.4; $P = 0.001$; $d = 1.02$) and at week 20 (−16.8 mm group difference; 95% confidence interval, −27.5 to −6.1; $P = 0.003$; $d = 0.88$). Minimal clinically important differences in pain intensity at week 20 were reported by 78% within the CST group, whereas 48% even had substantial clinical benefit. Significant between-group differences at week 20 were also found for pain on movement, functional disability, physical quality of life, anxiety and patients' global improvement. Pressure pain sensitivity and body awareness were significantly improved only at week 8. No serious adverse events were reported.

Discussion: CST was both specifically effective and safe in reducing neck pain intensity and may improve functional disability and the quality of life up to 3 months after intervention.

Key Words: craniosacral therapy, manual therapies, neck pain, sham treatment, randomized controlled trial

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Neck pain is a significant public health problem with 1 in 2 people experiencing neck pain at least once in their lifetime.[1] Neck pain is often recurrent, of nonspecific nature, and associated with disability in both social and occupational life.[2–4] For the treatment of chronic courses, evidence is still limited, as only therapeutic exercises, acupuncture, and manual therapies were recommended in recent clinical practice guidelines.[5–7] On asking manual therapists about their perception and use of complementary and alternative medicine for the treatment of chronic pain conditions, one repeatedly mentioned treatment was craniosacral therapy (CST).[8]

CST is thought to be a noninvasive, mindfulness-based treatment approach using gentle manual palpation techniques to release fascial restrictions between the cranium and the sacrum.[9] The craniosacral system anatomically encompasses the structures of the central nervous system including the skull, the cranial sutures, the cerebrospinal fluid, and the membranes of the brain and the spinal cord. It is influenced by and linked to the musculoskeletal system,[10] and presumably to the vascular and endocrine system as well as to the sympathetic and parasympathetic nervous system.[11] In the craniosacral theory, fascial restrictions within the craniosacral system lead to abnormal, arrhythmic motion of the cerebrospinal fluid. This craniosacral rhythm is assessable by palpation and quantifiable by encephalogram, myelogram, and magnetic resonance imaging.[12] There is also growing evidence for fascial involvement in pain chronification. Studies have shown increased activity of fascial nociceptors within restricted connective tissue, which can contribute to remodeling processes of inflammation and fibrosis, increased tissue stiffness, muscle tension, and chronic pain.[13,14] However, research on craniosacral diagnostic and treatment mechanisms revealed very heterogenous results,[11,12] with only preliminary evidence supporting inherent processes of peripheral and descending pain inhibition due to gentle fascial palpation techniques.[11,15,16]

The effectiveness of craniosacral treatment on health outcomes has been shown for a number of chronic pain syndromes, but it is limited to observational designs and randomized controlled trials with low to moderate methodological quality.[17–19] Efficacy studies and studies on musculoskeletal pain have not been conducted to date,[20] although neck and back pain were the most frequent symptoms for which CST was requested.[21] Therefore, this study aimed at investigating the efficacy of CST in chronic nonspecific neck pain in comparison with a manual sham control intervention.

BMC Musculoskeletal Disorders

RESEARCH ARTICLE Open Access

Craniosacral therapy for chronic pain: a systematic review and meta-analysis of randomized controlled trials

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Abstract

Objectives: To systematically assess the evidence of Craniosacral Therapy (CST) for the treatment of chronic pain.

Methods: PubMed, Central, Scopus, PsycInfo and Cinahl were searched up to August 2018. Randomized controlled trials (RCTs) assessing the effects of CST in chronic pain patients were eligible. Standardized mean differences (SMD) and 95% confidence intervals (CI) were calculated for pain intensity and functional disability (primary outcomes) using Hedges' correction for small samples. Secondary outcomes included physical/mental quality of life, global improvement, and safety. Risk of bias was assessed using the Cochrane tool.

Results: Ten RCTs of 681 patients with neck and back pain, migraine, headache, fibromyalgia, epicondylitis, and pelvic girdle pain were included. CST showed greater post intervention effects on: pain intensity (SMD = -0.32, 95%CI = [− 0.61,-0.02]) and disability (SMD = -0.58, 95%CI = [− 0.92,-0.24]) compared to treatment as usual; on pain intensity (SMD = -0.63, 95%CI = [− 0.90,-0.37]) and disability (SMD = -0.54, 95%CI = [− 0.81,-0.28]) compared to manual/non-manual sham; and on pain intensity (SMD = -0.53, 95%CI = [− 0.89,-0.16]) and disability (SMD = -0.58, 95%CI = [− 0.95,-0.21]) compared to active manual treatments. At six months, CST showed greater effects on pain intensity (SMD = -0.59, 95%CI = [− 0.99,-0.19]) and disability (SMD = -0.53, 95%CI = [− 0.87,-0.19]) versus sham. Secondary outcomes were all significantly more improved in CST patients than in other groups, except for six-month mental quality of life versus sham. Sensitivity analyses revealed robust effects of CST against most risk of bias domains. Five of the 10 RCTs reported safety data. No serious adverse events occurred. Minor adverse events were equally distributed between the groups.

Discussion: In patients with chronic pain, this meta-analysis suggests significant and robust effects of CST on pain and function lasting up to six months. More RCTs strictly following CONSORT are needed to further corroborate the effects and safety of CST on chronic pain.

Protocol registration at Prospero: CRD42018111975.

Keywords: Chronic pain, Craniosacral therapy, Complementary therapies, Meta-analysis, Systematic review

Background

Chronic pain disorders are the leading global cause of disability and are still increasing in prevalence [1]. Low back and neck pain, headache and migraine considerably affect all age groups from the beginning of adolescence to middle-aged and older adults [1]. The often limited effects and potential side effects of pharmacological treatments for chronic musculoskeletal pain conditions [2] may be reasons why patients frequently use complementary therapies [3–5]. Among them, Craniosacral Therapy (CST) is a typically requested treatment for complaints of the back and neck, headache and migraine, and associated stress-related and mental health problems [6, 7].

Derived from osteopathic manipulative treatment, CST consists of mindful, non-invasive fascial palpation techniques applied between the cranium and sacrum [8, 9]. Besides releasing myofascial structures, CST intends to

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Effects of CranioSacral therapy upon symptoms of post-acute concussion and Post-Concussion Syndrome: A pilot study

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Abstract

Objective: The purpose of this study was to investigate the utilization of CranioSacral Therapy (CST) in patients with Post-Concussion Syndrome (PCS) and capture patient-reported perceptions of clinical outcomes of lived treatment experiences.

Design: Two-part, longitudinal study conducted through a chart review of target group, followed by a Patient-reported Treatment Outcome Survey (PTOS).

Participants: A convenience sample of 212 patients with a historical incidence of head trauma not requiring hospitalization was obtained through medical records department dating back ten years. Inclusion criteria for further chart review (n = 67) was determined by identifying patients with a confirmed concussion directly correlated with presenting symptoms and for which CST was specifically sought as a treatment option. Demographics and patient-determined treatment duration data were analyzed by comparison groups extensively suggested in existing literature: Recovery time since injury as either Post-acute concussion (<6 months) or Post-Concussion Syndrome (PCS) (≥6 months); Athletes (A) or Non-athletes (NA); and traditional gender. Final PTOS group criteria was determined by eliminating confounding issues reporting (n = 47): (A, n = 24 and NA, n = 23).

Results: Quantitative data was analyzed via Numerical Analysis, and qualitative data was analyzed via Inductive Content Analysis. Symptoms reported in all charts as well as in the PTOS were consistent with identified PCS subtypes. Utilization of CST revealed that most patients determined the treatment effect upon concussion symptoms within 1-3 sessions. Nearly twice as many sessions were attended in the PCS than post-acute groups. Referral sources, studied for a perspective on local concussion after-care discharge planning, ranged from professional to personal recommendation or self-discovery. A majority of patients met goals of reducing post-acute or PCS as reasons cited by self-determined change-in-status or discharge from service. Patients were asked to indicate on the PTOS which pre- and post-treatment symptoms were helped or not helped by this particular intervention.

Conclusions: Patient-reported changes of PCS symptoms is critical when evaluating treatment options. CST is an experiential treatment that addresses subjective levels of dysfunction, thus it is the patient deciding the value of an intervention. A sizable portion of patients in all groups reported a positive effect upon their symptoms by CST. Patients indicated personal meaning to CST through their utilization of multiple sessions. A high percentage indicated the likelihood of referring others with PCS for CST. Of the 212 patient charts first studied, the 145 not meeting inclusion criteria suggest some chronic conditions may present as long-term effects of older head injuries. CST is a

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Review article

Perspectives on the effects and mechanisms of craniosacral therapy: A qualitative study of users' views

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Abstract

Introduction: Craniosacral Therapy (CST) is a 'body based' complementary or alternative medical practice which aims to support natural healing mechanisms. There is limited evidence regarding its effectiveness or mechanisms of action.
Methods: Qualitative study based on constant comparative methods informed by grounded theory. Semi-structured interviews explored 29 participants' experiences with CST. Inductive thematic analysis resulted in themes, concepts and illustrative quotes.
Results: Participants consulted for pain relief, emotional and psychological issues and help with rehabilitation. All but four participants reported improvement in at least two of the three dimensions of holistic wellbeing: body, mind and spirit, others in one. Experiences during CST included altered perceptual states and other specific sensations and emotions. The importance of the therapeutic relationship was emphasized. Theory emerging from this study regarding CST and the ways in which healing can be enabled holistically suggests that the establishment of a trusting therapeutic relationship enables CST to take clients into altered perceptual states; these in turn facilitate a new level of awareness regarding the interrelatedness of body, mind and spirit, together with an enhanced capacity to care for self and manage health problems.
Conclusion: All participants in this study observed positive changes in their health status and most attributed these to CST; these changes were frequently accompanied by new levels of health awareness which enhanced participants' capacity to self-care. Interviewees were self-selected users of CST and the data are therefore subject to certain methodological biases.

Keywords: Craniosacral therapy; Self-care; Holistic wellbeing; Qualitative; Grounded theory

Introduction

Craniosacral therapy (CST) is one of many complementary and alternative approaches to health care (CAMs). The cranial concept was developed from clinical experiences within the field of osteopathy by Dr Andrew Taylor Still (1828–1917), a practising physician, and subsequently one of his students William Garner Sutherland an American osteopath [1]. It is therefore based on careful observation and exploration of the body from the perspective of osteopathic practitioners. Dr John Upledger, also an osteopath, coined the term craniosacral therapy during the 1970s to differentiate the concepts and techniques of CST from pre-existing systems of cranial manipulation [2][2]. In the

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1876-3820/

[2] The difference between a CST practitioner and a cranial osteopath in the UK lies within the education. Since 2000, anyone who calls themselves an

Results of pilot study: Craniosacral biodynamics and the human apparatus of movement and the nervous system.

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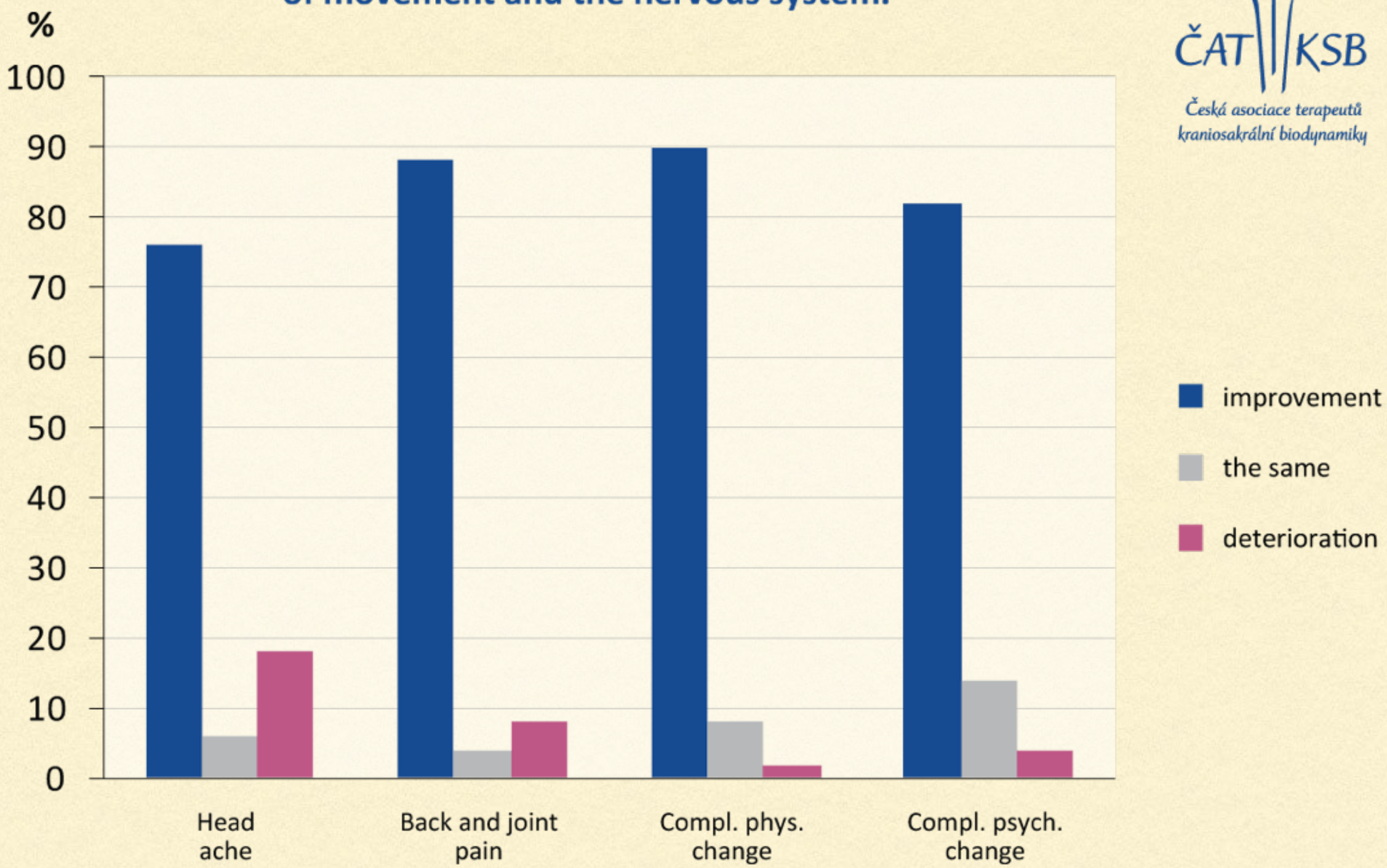

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A systematic review to evaluate the clinical benefits of craniosacral therapy

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Available online 22 August 2012

KEYWORDS
Craniosacral therapy;
Systematic review;
Complementary medicine;
Clinical benefit

Summary
Objective: Craniosacral therapy (CST) is an alternative treatment approach, aiming to release restrictions around the spinal cord and brain and subsequently restore body function. A previously conducted systematic review did not obtain valid scientific evidence that CST was beneficial to patients. The aim of this review was to identify and critically evaluate the available literature regarding CST and to determine the clinical benefit of CST in the treatment of patients with a variety of clinical conditions.
Methods: Computerised literature searches were performed in Embase/Medline, Medline® In-Process, The Cochrane library, CINAHL, and AMED from database start to April 2011. Studies were identified according to pre-defined eligibility criteria. This included studies describing observational or randomised controlled trials (RCTs) in which CST as the only treatment method was used, and studies published in the English language. The methodological quality of the trials was assessed using the Downs and Black checklist.
Results: Only seven studies met the inclusion criteria, of which three studies were RCTs and four were of observational study design. Positive clinical outcomes were reported for pain reduction and improvement in general well-being of patients. Methodological Downs and Black quality scores ranged from 2 to 22 points out of a theoretical maximum of 27 points, with RCTs showing the highest overall scores.
Conclusion: This review revealed the paucity of CST research in patients with different clinical pathologies. CST assessment is feasible in RCTs and has the potential of providing valuable outcomes to further support clinical decision making. However, due to the current moderate methodological quality of the included studies, further research is needed.

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A preliminary assessment of the impact of cranial osteopathy for the relief of infantile colic

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Affiliations

PMID: 16648084 DOI: 10.1016/j.ctcp.2005.12.005

Abstract

In this open, controlled, prospective study, 28 infants with colic were randomized to either cranial osteopathic manipulation or no treatment; all were seen once weekly for 4 weeks. Treatment was according to individual findings, and administered by the same practitioner. Parents recorded time spent crying, sleeping and being held/rocked on a 24-hour diary. A progressive, highly significant reduction between weeks 1 and 4 in crying (hours/24h) was detected (P<0.001) in treated infants; similarly, there was a significant improvement in time spent sleeping (P<0.002). By contrast, no significant differences were detected in these variables for the control group. Overall decline in crying was 63% and 23%, respectively, for treated and controls; improvement in sleeping was 11% and 2%. Treated infants also required less parental attention than the untreated group. In conclusion, this preliminary study suggests that cranial osteopathic treatment can benefit infants with colic; a larger, double-blind study is warranted.

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Effectiveness of craniosacral therapy in the treatment of infantile colic. A randomized controlled trial ☆

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Abstract

Objectives

To determine the effectiveness of Craniosacral Therapy (CST) for the treatment of infantile colic.

Material and methods

This randomized controlled trial was conducted on 58 infants, aged 0–84 days, diagnosed with infantile colic. The babies received a 30–40 minute CST session once a week (experimental group) or no treatment (control group). Babies in the CST group received either 1, 2 or 3 CST sessions over a 14-day period. Data were collected at 4 different times over the 24-day period, day 0 (baseline), day 7, day 14 and day 24. Crying (primary outcome) and sleep (secondary outcome) were evaluated using a crying and sleep diary, and colic severity was measured using the Infant Colic Severity Questionnaire (secondary outcome).

Results

There was a statistically significant difference between groups (CST and control) in crying hours ($F = 188.47$; $p < 0.0005$; $\eta 2 = 0.78$), sleep hours ($F = 61.20$; $p < 0.0005$, $\eta 2 = 0.54$) and colic severity ($F = 143.74$; $p < 0.0005$, $\eta 2 = 0.73$) across all the time points. In comparison with the control group, CST babies reported significant and clinically relevant effects in crying hours on day 7 (−2.47 h (95%CI, −2.95 to −1.99); $p < 0.0005$; $d = 1.73$), on day 14 (−3.29 h (95%CI, −3.7 to −2.8); $p < 0.0005$; $d = 2.87$) and on day 24 (−3.20 h (95%CI, −3.7 to −2.6); $p < 0.0005$; $d = 2.54$); in sleep hours on day 7 (−2.47 h (95%CI, −2.95 to −1.99); $p < 0.0005$; $d = 1.73$) on day 14

The Impact of Craniosacral Therapy/Cranial Osteopathy on Breastfeeding

Hazelbaker, Alison K., PhD, IBCLC, FILCA

Clinical Lactation Vol 11 Issue 1, Feb 2020, DOI: 10.1891/2158-0782.11.1.21

Abstract

Introduction

Many babies have suck dysfunctions and other difficulties that are due to fascial restrictions. These babies often do not respond to typical lactation care.

Method

Breastfeeding difficulties may be caused by strain patterns found in the cranial–sacral mechanism or somewhere else in the body. Strain patterns may be the result of intrauterine lie challenges, birth interventions and/or birth trauma, or postpartum events that compromise structure and function.

Results

Several recent randomized trials have found that craniosacral therapy and cranial osteopathy were effective and nonharmful treatments for babies with sucking problems that were negatively impacting breastfeeding.

Conclusion

Craniosacral therapy and cranial osteopathy, sister modalities, have been found to positively impact breastfeeding by rectifying structure–function strain patterns in babies.

Fascial restrictions causing articular changes of the cranial and cervical areas undermine breastfeeding and suck–swallow–breathe coordination in an alarming number of babies (**Frymann, 1966**; **Lalauze-Pol, 2009**; **Pizzolorusso et al., 2012**; **Waddington, Snider, Lockwood, & Pazdernik, 2015**). These babies may not respond to typical lactation management interventions (**Hershaft-LeRoy, Xhignesse, & Gaboury, 2016**; **Westcott, 2004**). Craniosacral

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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 (ms^2) 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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Girsberger W, Bänziger U, Lingg G, Lothaller H, Endler PC. Heart rate variability and the influence of craniosacral therapy on autonomous nervous system regulation in persons with subjective discomforts: a pilot study. *J Integr Med*. 2014; 12(3): 156-161.
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The effect of cranial techniques on the heart rate variability response to psychological stress test in firefighter cadets

Małgorzata Wójcik[1]✉ & Idzi Siatkowski[2]

Heart rate variability (HRV) is a simple tool to monitor cardiovascular stress. The proper function of the cardiovascular system is a problem among firefighters. Physical activity has health benefits correlated with psychological stress. Physically active people should be more resilient to psychological stress, but this has not always been demonstrated. The aim of this study was to determine whether cranial techniques would have an effect on HRV parameters. Osteopathy in the cranium reduces stress and improves cardiovascular function. Fifty-seven firefighter cadets aged 18–24 years (21.63 ± 1.41) participated in the study. All subjects had their heart rate variability measured and were randomly assigned either to the cranial techniques (CS) group, with therapy performed once a week for 5 weeks), or to the control group (CO). After 5 weeks, heart rate variability was measured again in both groups. In the Friedman test, in the CS group there was a statistically significant effect of cranial techniques on Heart Rate (HR) and Low Frequency (LF), but not on High Frequency (HF); in the CO group, a statistically significant difference was observed for HR, HF and LF. In the Nemenyi test, in the CS group there was a statistically significant difference for HR and LF and in the CO group for HR, HF and LF. After applying hierarchical clustering with Euclidean measure and the complete method, dendrograms were drawn up showing similarities for HR, HF and LF values. The cranial techniques and touch might exert a beneficial effect on HRV. Both factors can be used in stressful situations to lower HRV.

The autonomic nervous system (ANS), which influences the heart rate HR) in short-time intervals, is subdivided into two distinct components, namely the sympathetic nervous system (SNS) and parasympathetic nervous system (PNS). The SNS, known as the quick response system, predominates during elevated activity and stressful states and its stimulation results in an increase in HR. The PNS, known as the relaxed response system, predominates in the quiet and relaxing states, and is related to a decrease in HR. In healthy individuals, the two systems work together (promptly alternating between each other) to maintain the regulatory balance in physiological autonomic function. Autonomic function can be measured non-invasively from physiologic signals of heart rate, respiratory rate, and blood pressure. Heart Rate Variability (HRV), or the fluctuation in the length of time between heart beats (R-R intervals), provides a measure of sympathetic and parasympathetic interplay, and therefore ANS functional maturation[1]. High-frequency (HF) variability reflects parasympathetic function and is influenced by the respiratory rate, while low-frequency (LF) variability is due to a combination of sympathetic and parasympathetic inputs and baroreflex-induced changes in heart rate[2].

The professional activities performed by firefighters require continuous regulation of the cardiovascular system, with the predominant modulation of the sympathetic nervous system (SNS)[3]. The proper functioning of the cardiovascular system among firefighters is problematic[4]. Excessive stress on the cardiovascular system among this group has led to sudden cardiac deaths (SCDs)[5]. Participation in firefighting operations causes high levels of stress that negatively affect the cardiovascular system[6], thus causing a risk of cardiovascular disease in this occupational group[7]. The occupation of a firefighter is fraught with cardiac autonomic activity and sleep disorders[8].

Osteopathic craniosacral therapy involves the use of gentle and specialised techniques to minimise tension in the skull, pelvis, diaphragm, chest and sacrum. The therapy leads to the relaxation of connective tissue structures

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The Neurophysiological Effects of Craniosacral Treatment on Heart Rate Variability: A Systematic Review of Literature and Meta-Analysis

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Abstract

Craniosacral treatment (CST) is an osteopathic technique grounded in the assumption that there is an intrinsic, fine movement of the cerebrospinal fluid. This rhythmic movement can be utilized for diagnostic and therapeutic purposes by palpation and manipulation of the skull, spine, and associated connective tissues. Therapeutic benefit is likely due to action on the autonomic nervous system (ANS), specifically through the vagus nerve. Current literature on the neurophysiological effects of CST is limited, which has contributed to controversy regarding its effectiveness. Heart rate variability (HRV) as a measure of cardiovascular stress and autonomic system activity is thus proposed as a tool to evaluate the neurophysiologic effects of CST. HRV can be analyzed in two different bands, high-frequency (HF) and low-frequency (LF) power associated with a parasympathetic and sympathetic response. In this meta-analysis, we provide a brief introduction to CST, analyze three primary studies, and summarize the therapeutic benefits and pitfalls of this alternative treatment on the ANS. A significant negative HF standardized mean difference after CST was observed; standardized mean difference = -0.46; 95% CI (-0.79,-0.14). No significant effect on LF power was observed. We conclude that CST does provide a moderate short-term increase in parasympathetic activity. These findings suggest that CST may be used to treat patients with an overactive sympathetic state. Further studies should be conducted for comparison against a control group to eliminate the possibility of a placebo effect and to elucidate long-term effects.

Categories: Neurology, Osteopathic Medicine, Therapeutics
Keywords: sympathetic overactivity, parasympathetic stimulation, low-frequency power, high-frequency power, neurophysiology, cv4, autonomic nervous system dysfunction, osteopathic cranial manipulative medicine, heartrate variability, craniosacral therapy

Introduction And Background

The technique of craniosacral treatment (CST) originated from John E. Upledger, DO who discovered the rhythmic impulse of cerebrospinal fluid (CSF) upon grasping the dura mater during surgery for a patient who had been infected with Echinococcus [1]. While grasping the dura mater, he saw and felt the expansion of the dura mater in a consistent cycle. With no established explanation for the phenomenon he witnessed, Dr. Upledger dedicated research to the development of his theory, the Pressurestat model. Dr. Upledger further discovered that nerve tracts are found to originate from cranial sutures and travel to the choroid plexus of the ventricular system. His theory suggested that the choroid plexus, responsible for producing CSF and causing volume expansion within the ventricular system, transmits this expansion to the cranial sutures. Nerves originating from the cranial sutures where the dura mater is fused with the periosteum conduct this expansion. When a threshold of “stretch” is achieved, these nerves send negative feedback to inhibit CSF production. On the contrary, lack of CSF will decrease the distance between sutures promoting CSF production. It was later discovered that the cranial rhythmic impulse (CRI) is not an inherent function of the brain but rather a cerebrovascular wave pulse [2]. When the heart undergoes systole, blood propulsion distends cerebral arteries, compressing the ventricles and sending CSF into the subarachnoid space and spinal canal. With this mechanism in mind, it has been observed that the normal rate of CRI is 8-10 cycles per minute [1]. When disease is present in the body, this rate may vary. For example, Dr. Upledger mentions the research of Dr. Bunt and Dr. Allen, MD, who discovered that patients with idiopathic hydrocephalus have an irregular CRI rate of four cycles per minute [1]. Additionally, patients who were paralyzed secondary to spinal cord injury were found to have elevated CRI rates in areas below the injury but normal rates above [1]. Changes in the rate of CRI indicate areas of increased sympathetic activity related to pathology including inflammation, disease, and injury. CST seeks to restore balance to the autonomic nervous system (ANS) [3]. For example, one technique in practice is compression of the fourth ventricle (CV4) [4]. The CV4 technique involves the patient lying supine with the practitioner placing his or her thenar eminence along the lateral

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The Effect of Craniosacral Therapy on Blood Levels of Stress Hormones

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Abstract

(1) Background: Fire department cadets preparing to become firefighters and paramedics experience high levels of stress when participating in incidents like traffic accidents and fires. Stress adversely affects health and coping with it proves difficult. Unfortunately, there is no single method that reduces stress completely in humans. One non-invasive method for lowering stress hormone levels is craniosacral therapy. (2) Methods: Fifty-seven firefighting cadets aged 18-24 years (21.63 ± 1.41) participated in the study. They were randomly assigned to either a test group or a control group. Participants' blood levels of cortisol and CRH (corticotropin-releasing hormone) were assessed before and after the study. The study group underwent 5-week craniosacral therapy (1x per week). (3) Results: The Kruskal-Wallis test showed that the therapy group's result was statistically significant for CRH values (p-value=0.00067) and for cortisol values (p-value=<0.0001). Wilxocon and Dunn tests showed that statistical significance for cortisol after CS therapy between the control and study groups (p=0.0377), and for CRH between the control and study groups before (p=0.00634) and after the study (p=0.000887), and in the study group before and after the study (p=0.0101). (4) Conclusions: Five weeks of craniosacral therapy lowered stress hormone levels. This therapy is a non-invasive tool for reducing stress.

Keywords

stress; cortisol; corticotropin-releasing hormone

Subject

Public Health and Healthcare, Public, Environmental and Occupational Health

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The use and benefits of Craniosacral Therapy in primary health care: A prospective cohort study

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ABSTRACT

Background: Patients frequently use treatments complementary to standard primary care. This prospective cohort-study examined the use, benefits, and safety of Craniosacral Therapy (CST).
Methods: Consecutive out-patients utilizing CST from 2015 to 2019 were asked to provide anonymized data on symptom intensity, functional disability, and quality of life before and after treatment using an adapted 11-point numerical rating scale (NRS) version of the Measure Yourself Medical Outcome Profile (MYMOP). Treatment expectations were assessed as were concurrent therapies/medication and safety. Mean differences were analyzed using paired sample t-tests with 95 % confidence intervals (CI), predictors of treatment response using linear regression modelling.
Results: CST therapists submitted 220 patient records (71.4 % female) including 15.5 % infants and toddlers, 7.7 % children, and 76.8 % adolescents and adults. Patients received on average 7.0 ± 7.3 CST sessions to treat 114 different, acute and chronic conditions. Symptom intensity significantly decreased by -4.38 NRS (95 %CI=-4.69/-4.07), disability by -4.41 NRS (95 %CI=-4.78/-4.05), and quality of life improved by 2.94 NRS (95 %CI = 2.62/3.27). Furthermore, CST enhanced personal resources by 3.10 NRS (95 %CI = 1.99/4.21). Independent positive predictors of change in the adapted total MYMOP score included patients' expectations ($p = .001$) and therapists' CST experience ($p = .013$), negative predictors were symptom duration ($p < .002$) and patient age ($p = .021$); a final categorical predictor was CST type ($p = .023$). Minor but no serious adverse events occurred.
Conclusions: In primary care, patients and parents of underage children use CST for preventive and therapeutic purposes. Considering the design limitations, CST appears to be overall effective and safe in infants, children, and adults.

1. Introduction

Primary care patients suffering from acute and chronic diseases frequently use complementary treatments approaches in addition to standard medical care. This not only applies to adults [1–3] but also to parents of young children and adolescents.[4–6]

Craniosacral Therapy (CST) is derived from osteopathic manipulative treatment and uses mindful, very gentle fascial palpation techniques to reduce sympathetic arousal by modifying body rhythms [7,8] and to support the body's function and capability of self-regulation by relaxing physical and mental structures.[9–11] Treated areas not only include those between cranium and sacrum (as osteopathy does not exclusively treat bones) but also joints, muscles, fasciae, cardiovascular structures, and organs. While physical mechanisms of CST are still understudied, initial randomized controlled trials have shown specific treatment effects of CST on patient-reported outcomes.[12] Clinical trials have also revealed significant effects of CST in addition to treatment and effectiveness compared to standard therapies in e.g. patients suffering from chronic pain conditions,[13] infantile colic,[14] attention deficit hyperactivity disorder,[15] and asthma.[16]

Beyond that, patients report using CST as a complementary treatment strategy for headaches and migraine, dizziness and tinnitus, gastrointestinal disorders as well as stress-related and mental problems like depression and anxiety.[17,18] In children, CST is used to support symptom alleviation of respiratory, oncological, allergic, autism spectrum, and gastroenterological diseases.[19–21] In the UK and Switzerland, NHS cancer centers [22] and psychiatric university hospitals [23] have established treatment concepts integrating CST into conventional in-

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Cardiac autonomic response after cranial technique of the fourth ventricle (cv4) compression in systemic hypertensive subjects

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Affiliations
PMID: 30100295 DOI: 10.1016/j.jbmt.2017.11.013

Abstract

Objective: The aim of this study was to compare blood pressure (BP) behavior and heart rate variability (HRV) among hypertensive stage I and normotensive individuals who were submitted to the cranial technique of the 4th ventricle compression (CV4), an osteopathic technique.

Methods: In this experimental controlled study, thirty men between 40 and 60 years old were evaluated and divided into two groups: normotensive (NT) and hypertensive (HT). The CV4 maneuver was applied in both groups and BP was measured at 5 (five) different stages: pre and post-intervention, 5, 10 and 15min after technique. Time-frequency parameters were obtained from measurements of RR intervals. Data were analyzed using an ANOVA two-way for analysis of the condition factor (NT and HT) and times with p-value ≤ .05.

Results: There was a reduction in the BP of the HT group. A significant intergroup difference (p = .01) was noticed, with respect to the standard deviation of successive normal R-R intervals (SDNN) values, mainly between pre-intervention and 15min stages. Concerning root mean square of the mean squared differences (RNSSD) values, the highlights were differences between pre-intervention and 10min (p = .01) only in the NT group. There was an increase in high frequencies (HF) values and a low frequencies (LF) attenuation in both groups at all different stages.

Conclusion: The data showed a BP reduction in the HT group in pre-intervention/15min and an increase in parasympathetic activity and decreased sympathetic activity in both groups. This suggests a change in the sympathetic-vagal balance. However, further studies are needed to elucidate the data on BP reduction mechanisms with CV4.

Keywords: Heart rate variability; Hypertension; Musculoskeletal manipulations; Osteopathic medicine.

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The Effectiveness of CV-4 and Resting Position Techniques on Subjects with Tension-Type Headaches

William P. Hanten, EdD, PT
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Abstract: Tension-type headache (TTH) is a common reason for consulting a clinician. Manual therapies are being used in clinical settings to treat TTH with no documented research to validate their efficacy. This study investigated the effectiveness of CV-4 and resting position techniques on TTH sufferers. Sixty adults between the ages of 21 and 65 ($\bar{x}$=36, SD=12) who were experiencing a TTH were randomly assigned to groups. Subjects in the first group received a 10-minute session wherein multiple still points were induced using the CV-4 craniosacral technique. Subjects in the second group were placed supine in a resting position with the head and neck positioned for ten minutes in the most comfortable points in the ranges of protraction-retraction and flexion-extension. Subjects in the third group received no treatment; they lay quietly for 10 minutes. Pain intensity and the affective component of pain were measured before and after the treatments using visual analog scales. To determine if significant differences existed between the groups, a one-way multivariate analysis of covariance (MANCOVA) was used, followed by univariate tests and post-hoc tests. The MANCOVA was significant ($F=3.59$; $df=4,108$; $p<0.05$). Analyses of covariance for the variables of pain intensity and affect revealed significant differences among the groups ($F=5.38$; $df=2,56$; $p<0.05$ for intensity and $F=4.45$; $df=2,56$; $p<0.05$ for affect). Tukey tests revealed a significant improvement, in both intensity and affect scores, between the group receiving the CV-4 treatment and the no-treatment group and no significant difference between the group using only the resting position and the group receiving no treatment. The CV-4 technique is an effective technique for treating patients with TTH. Additional investigation is warranted to examine the duration of relief and to address the effectiveness of multiple treatment sessions utilizing the CV-4 and resting position techniques.

Key Words: CV-4, Resting Position, Tension-Type Headaches, Manual Therapy

In its 1998 classification the International Headache Society designated the term tension-type headache to

88% in women. They also stated that headache disorders are extremely prevalent and represent a major health

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Complementary Therapies in Clinical Practice

Volume 19, Issue 1, February 2013, Pages 11-14

Is craniosacral therapy effective for migraine? Tested with HIT-6 Questionnaire

Thuridur Solveig Arnadottir, Arun K. Sigurdardottir [a]

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Abstract

Objective

To determine whether or not craniosacral therapy alleviates migraine symptoms.

Methods

A cross-over experimental design was used with twenty participants, aged between 20 and 50 years, who suffered from at least two migraine attacks per month. Participants were randomly assigned to two equal-sized groups, A and B. All received six craniosacral treatments over four weeks and the groups answered the “HIT-6” Questionnaire four times; every four weeks (Times 1, 2, 3 and 4). Group A, received treatment after answering the questionnaire the first time, but Group B, answered the questionnaire twice before receiving treatment.

Results

Immediately after treatments and one month afterwards there was significant lowering in HIT-6 scorings compared with prior to treatment. There was also significant difference in HIT-6 scorings between Times 1 and 4 ($p = 0.004$). The effect size was 0.43–0.55.

BMC Complementary & Alternative Medicine

POSTER PRESENTATION Open Access

P02.55. Craniosacral therapy for migraine: a feasibility study

J Mann[1], S Gaylord[1*], K Faurot[1], C Suchindran[2], R Coeytaux[3], L Wilkinson[4], R Coble[1], P Curtis[1]

From International Research Congress on Integrative Medicine and Health 2012
Portland, Oregon, USA. 15-18 May 2012

Purpose

The purpose of this study was to evaluate feasibility and obtain preliminary efficacy estimates comparing craniosacral therapy (CST) with an attention-control condition for the adjunctive treatment of migraine.

Methods

Individuals with moderate to severe migraine were recruited from specialty clinics, family practices, and the university community. After confirmatory clinical evaluation and an 8-week run-in phase, those meeting study criteria (compliant with study procedures, at least 5 migraines per month) were randomized to 8 weekly CST or low-strength static magnet therapy (LSSM) treatments. Study participants were followed for 4 weeks after the conclusion of therapy. Primary outcome measures included headache frequency and headache-specific quality of life (HIT-6). Secondary headache-specific measures include headache-related disability (MIDAS), headache intensity, and abortive medication use.

Results

At baseline, participants reported a mean 14 headache days per month and severe headache-related quality-of-life impact and disability. Compliance with study procedures was excellent, with 60 of 69 randomized individuals completing 8 weeks of therapy. Individuals in both treatment groups appeared to benefit from the therapy. A significant difference, favoring CST, was noted by treatment group in mean headache hours per day 30 days post treatment (1.89 vs. 2.78, p=0.003). HIT-6 scores decreased significantly in both groups, but without a between-group difference at the last treatment visit. MIDAS scores improved in the CST, but not the LSSM group at 4 weeks post treatment. Headache intensity was reduced more in the CST compared with the LSSM group, but the difference was not statistically significant. Abortive medication use decreased substantially in both groups during treatment.

Conclusion

Our results show that conducting a randomized clinical trial of CST for migraine using a standardized protocol is feasible and that adjunctive CST may reduce headaches in those with severe migraine. Protocol modifications may enhance future investigations of CST for migraine.

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Article

Effect of a Craniosacral Therapy Protocol in People with Migraine: A Randomized Controlled Trial

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Abstract: *Background*: Migraine is a common neurological disorder, and it is the second leading cause of disability worldwide. Manual techniques based on physical therapy have been proposed to improve migraine aspects; however, further research is needed on their effectiveness. The aim of this study was to evaluate the effectiveness of a craniosacral therapy protocol on different features in migraine patients. *Methods*: Fifty individuals with migraine were randomly divided into two groups (n = 25 per group): (i) craniosacral therapy group (CTG), following a craniosacral therapy protocol, and (ii) sham control group (SCG), with a sham treatment. The analyzed variables were pain, migraine severity and frequency of episodes, functional, emotional, and overall disability, medication intake, and self-reported perceived changes, at baseline, after a 4 week intervention, and at 8 week follow-up. *Results*: After the intervention, the CTG significantly reduced pain (p = 0.01), frequency of episodes (p = 0.001), functional (p = 0.001) and overall disability (p = 0.02), and medication intake (p = 0.01), as well as led to a significantly higher self-reported perception of change (p = 0.01), when compared to SCG. In addition, the results were maintained at follow-up evaluation in all variables. *Conclusions*: A protocol based on craniosacral therapy is effective in improving pain, frequency of episodes, functional and overall disability, and medication intake in migraineurs. This protocol may be considered as a therapeutic approach in migraine patients.

Keywords: migraine; physiotherapy; manual therapy

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1. Introduction

A migraine is a primary headache, and it is one of the major leading causes of disability in people under the age of 50 [1,2]. Migraine constitutes a complex brain network disorder with a strong genetic basis that involves multiple subcortical, cortical, and brainstem regions [3]. Moreover, patients with migraine may present musculoskeletal dysfunctions [4], which in turn facilitate the development of migraine [5]. Furthermore, there are other types of alterations that can mediate the generation of migraines, such as certain emotional disorders [6,7]. Indeed, emotional stress and negative emotional events have been shown to play an important role in precipitating or exacerbating migraine attacks [7].

The most common preventive and symptomatic treatment for migraine is pharmacological. However, this type of treatment involves some side-effects, such as gastrointestinal, cardiovascular, and central nervous system complications [8]; hence, other treatments may be an alternative, such as psychological treatment, patient education, acupuncture, supervised physical activity, and manual techniques (i.e., chiropractic treatment and physiotherapy) [9–12].

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Assessing the efficacy and safety of Craniosacral therapy for migraine

A single center randomized controlled trial

Guangya Jiang, MD[a], Saichao Ma, MD[b], Jinfeng Zhao, MD[c], Ming Zhang, MD[d], Yan Li, MD[d], Wenli Chen, MD[b], Lin Cui, MD[e], Liuyun Jia, MD[e,*]

Abstract

Objective: Design a feasible study to assess the efficacy and safety of Craniosacral therapy (CST) in the treatment of migraine, using a rigorous and innovative randomized controlled study design involving complementary light-touch sham treatments (CLST) as an attention control intervention.

Methods: This was a single-center, randomized, cross-over placebo-controlled experimental design. A total of 87 participants who suffered migraine attacks from 4 to 9 per month were randomly assigned into either 2 weekly units of CST or CLST for 4 weeks. And then the 2 groups were crossed and continued treatment for 4 weeks plus a follow-up observation for 4 weeks. As the primary outcome measures, Headache Impact Test-6 (HIT-6) and headache frequency were assessed every 4 weeks (at baseline, week 4, week 8 and week 12). The secondary outcome was the scores of Headache Disability inventory (HDI) and the Hamilton Anxiety Scale (HAMA) as well as the adverse events.

Results: All 87 individuals had been screened for eligibility, of which 60 were licensed for the study. The difference of HIT-6 and headache frequency between the 2 groups was not significant at the baseline. But the headache frequency and HIT-6 of 2 groups were all declined respectively after the CST at week 4 (group A) and week 8 (group B) than before (P^{*}= 0.01 < 0.05, 95% CI, −3.06 to −1.87; $P^{※}$= 0.01 < 0.05, 95% CI, −3.52 to −2.53; P^{1A} = 0.01 < 0.05, 95% CI, 4.55–11.7; P^{2B} = 0.01 < 0.05, 95% CI, −11.78 to −6.01) while the changes were not obvious after CLST with previous treatment. The scores and frequency of fourth evaluation showed that there was no significant increase or decrease in both the 2 groups. Besides, we found that the mean scores of HIT-6 for all participants, compared with the baseline, were decreased significantly after the 3 round treatments (P^{3A} = 0.01 < 0.05, 95% CI, −13.12 to −6.4; P^{3B} = 0.01 < 0.05, CI, −12.73 to −6.69). We also showed the similar result in the scores of HDI and HAMA.

Conclusion: The results indicated that standardized CST was both effective and safe in alleviating the migraine intensity and frequency as well as the headache-related disability. Further larger research is needed.

Abbreviations: CLST = complementary light-touch sham treatments, CST = Craniosacral therapy, HAMA = Hamilton Anxiety Scale, HDI = Headache Disability inventory, HIT-6 = Headache Impact Test-6.

Keywords: complementary light-touch sham treatments, Craniosacral therapy, headache frequency, Headache Impact Test-6, migraine

1. Introduction

Migraine is a common disabling condition that spans the globe.[1] According to the review by Burch et al, migraine affects approximately 1 out of every 6 American adult population and 1 in 5 women over the past 3-month period.[2] Unlike other chronic diseases, people who are usually healthy, young and meddle-aged are more likely to get sick and women are more prone than men, especially for those aged 18 to 44 years.[3] Although migraine itself does not reduce life expectancy and the morbidity decreases as people age, it can have considerable impact on peoples' lives and present a significant socioeconomic burden.[4] Those who are experiencing severe migraine may be tired to do daily activities or even absent from

The authors have no funding and conflicts of interest to disclose.

All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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Comparison of Craniosacral Therapy and Myofascial Relaxation Techniques in People with Migraine Headache: A Randomized Controlled Study

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https://doi.org/10.1016/j.jcm.2024.08.010 ↗

Abstract

Objective

The primary objective of this study was to investigate the impact of myofascial release and craniosacral therapy on the quality of life, pain levels, and range of motion (ROM) in patients with chronic migraine headaches. The secondary aim of this study was to develop a migraine treatment protocol using current craniosacral techniques.

Methods

Patients with chronic migraine in the Neurology Department of ALKU Hospital were randomly allocated to 3 therapy groups: (1) Craniosacral Treatment Craniosacral

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Effectiveness of craniosacral therapy in cervicogenic headache

Abstract

Background: Headache is common phenomenon experienced by everyone at some point in their lives. Hence it's not surprising that the global estimate of headache sufferers is around 46% and prevalence of Cervicogenic headache is 2.5-4.1% among all headache types. This prevalence might appear to be relatively low as compared to other headache types like migraine or tension type headache but the associated disability is alarming and high. Craniosacral therapy is a light touch modality which is fairly safe, non-invasive and non-pharmacological mode of treatment which can cure a wide array of musculoskeletal and neurological conditions including headaches but which has limited evidence of effectiveness in literature especially in Cervicogenic Headache. Hence this study aimed at assessing the effectiveness of craniosacral therapy as a treatment modality in the management in Cervicogenic headache.

Methods: This study hypothesized that Craniosacral Therapy will demonstrate better improvement in all sub-sections of the Headache Impact Test (HIT-6) which measures the quality of life and also demonstrate reduced frequency and duration of Cervicogenic headache as measured by a self-maintained headache diary. Selection criteria for inclusion in the study were subjects of both gender, age 18 and above and meeting the Cervicogenic Headache International Study Group diagnostic criteria for Cervicogenic Headache. All subjects were treated 3 times a week on alternate days for 3 weeks.

Results: 94 individuals were screened for eligibility of which 49 met the selection criteria for the study. Headache-related disability was present 3.4±4.1 days during the 3week period. The average of the HIT-6 score pre- treatment was 67.6±7.8 points and post- treatment was 42.7±3.6. The Correlation analysis of the frequency of headache attacks and duration of disability according to the headache diary significantly correlated with the severity of headache-related disability at each attack.

Conclusion: Craniosacral therapy is an effective treatment strategy for patients of Cervicogenic Headache as measured on HIT-6 during a 3week treatment program.

Keywords: cervicogenic headache, craniosacral therapy, HIT-6, headache diary

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Abbreviations: CGH, cervicogenic headache; CST, craniosacral therapy

Introduction

Headache is common phenomenon experienced by everyone at some point in their lives. Hence it's not surprising that the global estimate of headache sufferers is around 46% and prevalence of Cervicogenic headache is 2.5-4.1% among all headache types.[1,2] This prevalence might appear to be relatively low as compared to other headache types like migraine or tension type headache but the associated disability is alarming and high. Cervicogenic Headache (CGH) arises mainly from dysfunction in the first three upper cervical segments.[3] The probable pathway by which pain initiating in the neck can be referred as a headache is the trigeminocervical nucleus which descends in the spinal cord to the area of C3 or sometimes C4. These structures are further in anatomical continuity with the dorsal gray columns of the same spinal segments.[4] Therefore, input from sensory afferents primarily from any of the upper three cervical nerve roots can be mistaken to be perceived as pain in the head[3] through a process called as convergence. Although the pathophysiology is not totally clear there are definite articular, muscular and neural mechanisms which are at play.[5] The average age of onset has been marked as 33-43years and the mean of the duration of presence of symptoms at 7-17 years.[1,2] The chronicity seems to develop through increase in frequency of headache which are short lasting and not continuous or unrelenting.

Various management strategies start with pharmacological medications but they have little role[6] in the long course of such headaches so other strategies like manual and manipulative therapy,[7–12] Low Level Laser Therapy,[13–15] recommendations for sleep, exercise, stress reduction through behavioral interventions are found to be effective for treatment of CGH. The effectiveness of non-pharmacological interventions for the treatment of CGH is warranted to reduce the side effects of medications and to provide comfort of intervention.

Craniosacral therapy (CST) is a light touch modality which is fairly safe, non- invasive and non-pharmacological approach which is applied as a gentle manual force to address somatic dysfunctions of the head and the remainder of the body. This treatment is aimed at mobilizing the cranial sutures which are restricted leading to a loss of

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Effects of Craniosacral Osteopathy in Patients with Peripheral Vestibular Pathology

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Affiliations

PMID: 32906128 DOI: 10.1159/000509486

Abstract

Introduction: Vertigo appears as a result of a sudden neural activity imbalance of the vestibular system. The vertigo prevalence is higher in patients over 60 years of age compared to patients under 40 years of age.

Objectives: The purpose of this study was to analyze the effect of craniosacral osteopathy on dizziness and balance in individuals who have peripheral vestibular pathology.

Methods: A total of 30 individuals, aged 24-50 years, participated in this study. Twenty-four of the participants were female (80%) and 6 were male (20%). The participants were separated into 2 groups, with 15 patients included in the cranial osteopathy treatment group (study group) and 15 patients included in the group that used dimenhydrinate (control group). The individuals were evaluated in terms of dizziness and balance. A visual analog scale was used to evaluate dizziness. Balance was evaluated using the Berg balance scale and the Activities-Specific Balance Confidence scale. The craniosacral treatment program was applied once per week for 6 sessions. All of the individuals included in this study were evaluated 3 times, i.e., prior to treatment, on the third week of treatment, and on the sixth week of treatment.

Results: Significant improvement was noted within each group in terms of dizziness and balance ($p < 0.05$). When the groups were compared with each other, it was observed that craniosacral osteopathy was more effective than dimenhydrinate treatment for dizziness and balance ($p < 0.05$).

Conclusion: Craniosacral osteopathy is an effective treatment choice in individuals who have chronic peripheral vestibular pathology. In individuals who have resistant and chronic vestibular pathology, craniosacral osteopathy should be evaluated among the treatment choices.

Keywords: Balance; Osteopathy; Peripheral vertigo; Peripheral vestibular pathology; Vertigo; Vestibular disorders; Vestibular suppressant.

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S. Karger AG, Basel, Switzerland

J Gerontol Nurs. 2008 Mar;34(3):36-45. doi: 10.3928/00989134-20080301-04.

Craniosacral still point technique: exploring its effects in individuals with dementia

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Affiliations

PMID: 18350746 DOI: 10.3928/00989134-20080301-04

Abstract

A mixed methodology was used to explore the effects of craniosacral still point technique (CSPT) in 9 older adults with dementia. Participants were monitored at baseline (3 weeks), intervention (6 weeks), and postintervention (3 weeks) using the modified Cohen-Mansfield Agitation Inventory (M-CMAI). CSPT was implemented daily for 6 weeks by a certified craniosacral therapist. Findings indicated a statistically significant reduction in M-CMAI total and subscale scores during the intervention period. This reduction continued during postintervention for subscale scores of physical nonaggression and verbal agitation. Staff and family interviews provided convergent validity to the quantitative findings. Participants were also more cooperative during caregiving activities and displayed meaningful interactions.

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Effectiveness of craniosacral therapy in the human suboccipital region on hamstring muscle: A meta-analysis based on current evidence

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Background:

Craniosacral therapy (CST) has remained controversial in the treatment of musculoskeletal disorders. To our knowledge, there is no larger sample size of research to demonstrate the effectiveness of craniosacral therapy in the human suboccipital region on hamstring muscle.

Methods:

To study whether the CST in the human suboccipital region could have a remote effect on the flexibility of the hamstring muscles, the Cochrane Library, Medline/Pubmed, CNKI, Embase, and Google Scholar were searched. Clinical trials assessing the effects of CST in short hamstring syndrome patients were eligible. Mean differences (MD) and 95% confidence intervals (CI) were calculated for the straight leg raise test (primary outcomes). The quality of the included studies was assessed using the Newcastle-Ottawa Scale. RevMan 5.3 software was used for data analysis.

Results:

Five controlled trials with a total of 238 participants were included. CST could effectively relieve the symptoms of short hamstring syndrome patients [the overall MD −9.47, 95% confidence interval (CI) −15.82 to −3.12, $P < .000001$]. The CST was better than the proprioceptive neuromuscular

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Effect of craniosacral therapy on lower urinary tract signs and symptoms in multiple sclerosis

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Keywords:
Multiple sclerosis
Craniosacral therapy
Urinary symptoms

A B S T R A C T

To examine whether craniosacral therapy improves lower urinary tract symptoms of multiple sclerosis (MS) patients. A prospective cohort study. Out-patient clinic of multiple sclerosis center in a referral medical center. Hands on craniosacral therapy (CST). Change in lower urinary tract symptoms, post voiding residual volume and quality of life. Patients from our multiple sclerosis clinic were assessed before and after craniosacral therapy. Evaluation included neurological examination, disability status determination, ultrasonographic post voiding residual volume estimation and questionnaires regarding lower urinary tract symptoms and quality of life. Twenty eight patients met eligibility criteria and were included in this study. Comparison of post voiding residual volume, lower urinary tract symptoms and quality of life before and after craniosacral therapy revealed a significant improvement ($0.001 > p > 0.0001$). CST was found to be an effective means for treating lower urinary tract symptoms and improving quality of life in MS patients.

1. Introduction

Lower urinary tract symptoms (LUTS), especially increased urinary frequency and urgency are common complaints and a cause of impaired quality of life (QoL) in multiple sclerosis (MS) patients with resultant significant physical and emotional stress upon them.[1] It has been shown that the correlation between subjective and objective measures of urinary function in MS patients is quite complex, further complicating follow-up, decision to treat and treatment evaluation.[2] In the majority of MS patients LUTS have been shown to stem from bladder dysfunction and can be classified to have an upper motor neuron etiology. The pathological process in MS consists of a demyelinating process most commonly involving the posterior and lateral columns of the cervical spinal cord, and therefore voiding dysfunction is quite common.[3] Additionally, the loss of supraspinal control which stems from demyelinating insult to the brain leads to involuntary reflexive bladder contractions having specific urodynamic characteristics, and sometimes to neurogenic incontinence.[4] Moreover, bladder areflexia or impaired coordination of the detrusor muscle and the urinary bladder sphincter in the form of detrusor sphincter dyssynergia (DSD) may be present in a subset of MS patients.[5]

In an attempt to ease the burden of LUTS in MS patients, several pharmalogical and non-pharmalogical treatments have been described.[5] Among the pharmacological available agents, several options are available for MS patients in order to decrease number and amplitude of involuntary bladder contractions and increase its storage capacity. These include the oral anticholinergic drugs oxybutynin, tolterodine and trospium in varying doses, and the intravesical installation of atropine.[6–8]

Recently, complementary medicine and unconventional therapies have been shown to be effective for a wide range of medical problems, including MS.[9] Of those modalities, craniosacral therapy (CST) has been shown to be effective in treating several neurological conditions affecting the central nervous system (CNS).[10]

The craniosacral system is an integrated physiological system which consists of the membranes and cerebrospinal fluid that surround and protect the brain and spinal cord, the bones to which these membranes attach, and connective tissue elements ultimately related to the membranes . The system extends from the bones of the skull, face and mouth which make up the cranium down to the sacrum, or tailbone area. As with other human physiological systems, the craniosacral system may be either influenced by or influences other systems, like the nervous, musculoskeletal, vascular, lymphatic, endocrine and respiratory systems. Early observations originating in the 1970's have shown that the fluid

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The Effect of an Alternative Medical Procedure Upon Low-Frequency Oscillations in Cutaneous Blood Flow Velocity

Kenneth E. Nelson, DO,[a] Nicette Sergueef, DO,[b] and Thomas Glonek, PhD[c]

Abstract

Objective: Compression of the fourth ventricle (CV-4) is a manual, noninvasive procedure that reportedly affects the cranial rhythmic impulse, a phenomenon recognized by practitioners of cranial manipulation, that is concomitant with low-frequency Traube-Hering (TH) oscillations in blood flow velocity. This study examines the CV-4 and its effect upon blood flow velocity.

Methods: Human subjects were paired with 28 individual physicians for application of the CV-4, and the duration of the application was recorded. Flowmetry records tracking the course of the procedure were obtained, 20 of which were useable for intergroup comparisons. Segments of these records (control, treatment, response) were Fourier-transformed; the Fourier-transformed spectra were subtracted from one another and the resultant difference-spectra compared.

Results: The mean CV-4 procedure length was 4.43 ± 2.22 minutes. The mean frequency of the TH waveform visible in the blood flowmetry record was 7.10 ± 2.07 cpm. The CV-4 procedure specifically affected the low-frequency oscillations in blood flow velocity. After application, the amplitude of the TH, 0.10 Hz, frequency wave increased (relative area units: control minus treatment [0.08010 units) compared with control minus response [−0.03358 units]; $P = .011$).

Conclusions: This study showed that CV-4 has an effect on the TH frequency component of blood flow velocity. The practitioners of cranial manipulation who participated in this study affected their subjects in a quantifiable manner with the application of the CV-4 procedure. (J Manipulative Physiol Ther 2006;29:626-636)

Key Indexing Terms: *Skull; Manipulation, Osteopathic; Flowmeters; Blood Circulation; Baroreflex*

Cranial manipulation is a treatment modality that is classified as a form of alternative (manual) medicine. Its clinical indication is the treatment of somatic dysfunction (balanced membranous tension) of the head, and of the remainder of the body, through the use of gentle manually applied forces. It is thought to affect the patient, in part, through modulation of the proposed primary respiratory mechanism (PRM).[1-3] One manifestation of this mechanism is a palpable oscillation with a reported frequency from 4 to 14 cycles per minute, called the cranial rhythmic impulse (CRI).[4-13] The PRM/CRI is a subtle phenomenon that reportedly is readily palpable only by experienced individuals, thus making its very existence subject to debate.[14,15] Therefore, it is appropriate to attempt to elucidate the PRM/CRI in the context of established physiologic phenomena.

Within human physiology, there are documented low-frequency oscillations that occur at rates approximating those reported for the PRM/CRI. One such phenomenon, a complex waveform demonstrable in blood pressure and blood flow velocity, is the Traube-Hering-Mayer (THM) oscillation (Fig 1). This complex phenomenon has been subdivided into 3 contributing components of independent frequencies. Of particular interest to this study, because multiple authors have commented upon the similarity between the Traube-Hering (TH) wave and the CRI,[16-19] is the TH oscillatory component that has a frequency reported here (Table 1) of 5 to 9 cycles per minute (0.09-0.15 Hz). The TH waveform was first described as an independent phenomenon when, in 1865, Traube[20] reported measurement of a pulse pressure fluctuation at the frequency of respiration that persisted, however, after respiration had been arrested. Fourier-transform analysis of blood physiologic parameters shows the 3 principle

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Combining psychotherapy with craniosacral therapy for severe traumatized patients: A qualitative study from an outpatient clinic in Norway

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ABSTRACT

Background: Craniosacral therapy (CST) is an established complementary modality for several health complaints. A clinic for psychosomatics in Norway has included CST into a multimodal treatment approach for severely traumatized patients. The aim of this study was to investigate and describe the indications for the use of craniosacral therapy within trauma therapy. Specifically, to explore treatment philosophy, criteria for improvement, treatment aims, and the evaluation of the risk profile of the multimodal treatment approach.
Methods: Semi-structured individual interviews (n = 8) and one focus group interview were conducted with the therapists at the Clinic for Psychosomatics, Hospital of Southern Norway, Kristiansand, Norway. The text data were transcribed verbatim, and the analysis of the material was conducted according to conventional and direct content analysis.
Results: The therapists at the clinic applied a holistic treatment approach, based on their understanding of mind and body as one entity. To access emotions and traumata, they used a mixture of different treatment techniques. The therapists experienced patients with severe bodily symptoms as being less cognitively present and attributed this to the symptoms craving most mental resources. The craniosacral therapists' specific aims and task within the multimodal trauma therapy was to ease these physical complaints, so that cognitive and emotional resources could be utilized for therapy. The psychotherapists found that emotions and traumata were more accessible after CST. The general treatment goals were to increase symptom tolerance levels and to enable better self-care. Furthermore, the ability to transform negative behaviors and develop positive alternatives were considered to be signs of improvement.
Conclusion: The study participants considered that patients with complex traumas, including post-traumatic stress disorder, seemed to benefit from this multimodal treatment approach and appreciated its' holistic treatment philosophy, including craniosacral therapy. With regard to patient safety, the study participants recommended that craniosacral therapy for severely traumatized patients should only be provided in cooperation with psychotherapists, or other highly qualified health personnel working in specialized institutions.

1. Background

In psychology, the term trauma is used in situations that adversely affect the individual's mental health or personality development.[1] Post-traumatic stress disorder (PTSD) can occur following exceptionally threatening or traumatic events.[2,3] Common symptoms include

Abbreviations: NAFKAM, The National Research Center in Complementary and Alternative Medicine; PTSD, Post-traumatic stress disorder; TFCBT, trauma-focused cognitive behavioral therapy; EMDR, Eye movement desensitization and reprocessing; CBT, cognitive behavioral therapy; CSF, cerebrospinal fluid; CAM, complementary and alternative medicine; IRCT, International Rehabilitation Council for Victims of Torture; NET, Narrative Exposure Therapy; DPS, District Psychiatric Center; TMJ, temporomandibular; HSCL 25, Hopkins symptom check list 25

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Original Article

Effect of Craniosacral Therapy on students' symptoms of attention deficit hyperactivity disorder[1]

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Objectives: Complementary and alternative medicine methods (CAM) are now used for a wide range of disorders. Craniosacral therapy (CST) is one of CAM methods in which manual maneuvers with light forces are used for different aspects of health. In the present research, the effects of CST were studied for reducing symptoms of attention deficit and hyperactivity disorder (ADHD).

Method: Twenty-four children with ADHD were recruited as an available sample from Roshd Occupational Therapy Center and divided randomly into control and experimental groups. Before and after intervention, the Conner's Parents Rating Scale as well as child's symptom inventory-4th was filled out by parents. Both groups participated in occupational therapy programs as a routine intervention, while the experimental group received an additional CST for 15 sessions, twice a week. The collected data were analyzed as the covariance method by SPSS16.

Results: CST showed significant effects on increasing attention, reducing hyperactivity, oppositional defiant, conduct disorder, anxiety and embarrassment, social problems and psychosomatic problems of the participants.

Discussion: CST as a type of biomechanical correction can facilitate improvement in children with symptoms of ADHD.

Keywords: Complementary medicine, alternative medicine, craniosacral therapy, Attention deficit hyperactivity disorder, Cerebro spinal fluid (CSF).

Submitted: 14 September 2013
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Introduction

Attention deficit hyperactivity disorder (ADHD) with a set of hyperactivity symptoms, impulsive behaviors and attention deficit leads to concentration problems (1). The disorder consists of three types including hyperactivity-impulsivity, attention and concentration deficit and mixed type (2). The prevalence rate of the disorder in students and is estimated to occur in 3-7% of school aged children (1) and in Tehran have been reported 3-6% (3). The disorder is always associated with a wide range of negative consequences for children (4, 5) and high costs to the family and communities (6), therefore this disorder is considered as one of collective health problems (7). Nowadays, medication is the most common treatment method in children with ADHD. But, due to the wide range of heterogeneity in children with ADHD, medication is not effective in all clients. Furthermore, even some drugs such as methylphenidate which has been approved by the U.S. Food and Drug Administration as a first-line treatment for people ADHD, has different adverse effects. These side effects strongly deteriorates patients' ability to manage their cognitive function such as attention and concentration (8). Therefore, the medication alone cannot meet the therapeutic requirements of children with ADHD and shall be combined with other intervention methods (9). Hitherto, twenty - four alternative treatments are identified in patients with ADHD. Among them are oligoantigenic diets, Enzyme-potentiated desensitization, Relaxation / EMG biofeedback, EEG biofeedback, massage, meditation, mirror feedback,channel-specific Perceptual training, and vestibular stimulation. A few have some supports for their effectiveness in some selected subgroup of patients while, many of them have no documented and or convincing evidences of efficacy.

National Centre for Complementary and Alternative Medicine (NCCAM) has introduced a group of

1- The article is derived from Master thesis.

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The use of CranioSacral therapy for Autism Spectrum Disorders: Benefits from the viewpoints of parents, clients, and therapists

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Affiliations

PMID: 28167177 DOI: 10.1016/j.jbmt.2016.06.006

Abstract

Objectives: The objectives of this preliminary study were to explore: the use of CranioSacral Therapy for persons with Autism Spectrum Disorder, the demographics of participants, and the retrospective interpretation of reported changes related to the intervention. Participants included therapists, parents, and clients.

Methods: Recruitment of participants was conducted through electronic social and professional networks. Online questionnaire surveys were provided. Demographic questions were posed to understand both the extent of clinical use and the rationales for such treatment, and surveys were unique to each subject groups. All participants were given a 20-item functional behavior checklist as a means to measure their perception of change attributed to this intervention. Open-ended comments were also encouraged to explore perspectives from their experiential treatments. The Qualitative data collected was analyzed via Inductive Content Analysis. The data was stored on excel and analyzed manually and independently by all 3 authors.

Results: A total of 405 people responded to the recruitments and of the participants who completed surveys, 264 were therapists and 124 parents. Only a small sampling of clients responded. The demographics of professionals using CST for ASD, their level of CST training, and their qualifications to work with ASD were reflected. Demographics and referral sources of parents, and other details of their experiences, were surveyed. Perceived changes to the use of CST were explored through analysis of responses to both the Likert scale as well as the open comments.

Conclusions: This preliminary study introduces the concept of CranioSacral Therapy as a treatment option for symptoms associated with ASD. Its clinical use has been available for three decades but few empirical studies exist. The results of the survey suggest that CST is already being professionally recommended as a treatment. This study found that there were positive responses observed by all 3 targeted groups leading to the authors concluding that there is worthy cause to further investigate how CST benefits Autism Spectrum Disorders (ASD).

Keywords: Autism Spectrum Disorders (ASD); Brain inflammation; CranioSacral Therapy (CST); Experiential treatment; Upledger 10-Step protocol.

Related information

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A Longitudinal, Observational, and Descriptive Study About Benefits of Craniosacral Therapy in Child Neurodevelopment

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Affiliations

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Abstract

Introduction: Coordination and balance are progressive motor skills that guide physical therapists in recognizing abnormal patterns during childish neurodevelopment. We aim to compare the efficacy of craniosacral therapy (CST) together with balance and coordination therapy (BCT) vs traditional BCT during neurodevelopment.

Methods: Longitudinal, observational, and descriptive study with 111 apparently healthy children divided into 4 groups: craniosacral-balance and coordination therapy placebo (CS-BCTp), craniosacral-balance and coordination therapy (CS-BCT), balance and coordination therapy placebo (BCTp), and balance and coordination therapy (BCT).

Results: Significant changes have been observed with the CS-BCT from the fourth session. Balance and coordination therapy is less effective. There are differences in the Battelle Scale at the beginning and after the 7 therapy sessions in the CS-BCT group.

Conclusions: The study shows that CST together with balance and coordination exercises can be a more effective and faster treatment to improve these motor skills, correcting and improving alterations during child neurodevelopment.

Keywords: balance; children; coordination; craniosacral therapy; neurodevelopment.

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CASE REPORT

The effect of cranial osteopathic manual therapy on somatic tinnitus in individuals without otic pathology: Two case reports with one year follow up☆

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KEYWORDS
Cranial osteopathy;
Somatic tinnitus;
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Craniosacral therapy;
Manual therapy

Abstract The following case reports present the effect of treating proposed cranial bone dysfunctions on chronic somatic tinnitus, following head trauma, with one year follow up. Both cases were suffering from chronic tinnitus on the right side without any otic pathology or temporomandibular dysfunctions. Temporary and limited effects of medications and other treatments on their persistent tinnitus had a negative effect on their social interactions and quality of life. Both patients were considered to demonstrate marked sphenoid, temporal and occipital bone dysfunctions, based on manual cranial treatment. Active tender points were also identified with intra-oral palpation and examination on the lateral pterygoid muscle on the right side.

Manual therapy of the cranial bones for restoration of normal alignment and cranial rhythm and myofascial release technique to deactivate tender points on the lateral pterygoid had a significant effect on reducing the persistent tinnitus in both patients. At one-year follow up, both patients reported significant improvement in their quality of life and social interactions without recurrence of their tinnitus symptoms. The findings of this study suggest that cranial manual therapy and

☆ This research was reviewed and was approved by the Human Subject Committee at University of Social Welfare and Rehabilitation Sciences.

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Temporal bone misalignment and motion asymmetry as a cause of vertigo: the craniosacral model

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PMID: 19943575

Abstract

Objective: To describe dysfunction of the craniosacral system, particularly temporal bone motion asymmetry, as a cause of vertigo and to suggest a new perspective on research, diagnosis, and treatment.

Data sources: A database search was conducted using MEDLINE, CINHAL; Health Sources: Nursing/Academic Edition; and the Internet.

Keywords: vertigo diagnosis and treatment, craniosacral therapy, temporal bones, cranial bone mobility, Upledger, and temporomandibular disorders.

Study selection: Articles that most clearly described a relationship between cranial bone misalignment and vertigo were selected for review.

Conclusion: Clinical experience suggests that craniosacral therapy is a powerful evaluative and treatment modality for vertigo patients who have not found relief from medical treatments. A narrative review of the literature describes and supports a theoretical link between dysfunction of the craniosacral system and vertigo. Dysfunction of the craniosacral system may include osseous, dural membrane, and fascial restrictions leading to asymmetric temporal bone movement and hence vertigo. Clinical trials are necessary not only to verify that craniosacral therapy is an effective treatment but also to determine the full range of symptoms and medical diagnoses for which craniosacral therapy is beneficial.

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Management of Post-Viral Postural Orthostatic Tachycardia Syndrome With Craniosacral Therapy

Leonid Tafler • Aysham Chaudry • Heejin Cho • Angeles Garcia

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Abstract

Postural Orthostatic Tachycardia Syndrome (POTS) is a rare disorder of the autonomic nervous system. The number of people afflicted with this dysautonomia has increased dramatically in recent years due to the long-term effects of coronavirus disease (COVID-19); however, it is largely underdiagnosed. This case report is about a patient with post-viral neuropathic POTS. Neuropathic POTS is believed to be due to the damage of small nerve fibers that regulate the constriction of the blood vessels in the limb and abdomen, which leads to interference with vasoconstriction, and therefore causes tachycardia. Current literature emphasizes a treatment that is based on lifestyle modifications, such as increasing water and salt intake, and symptomatic pharmacological treatment. In this case, the 39-year-old male ptient was treated with osteopathic manipulative treatment (OMT), specifically the compression of the fourth ventricle (CV4), which has been associated with the production of hyperparasympathetic and anti-inflammatory effects and, hence, helps overcome the small-fiber neuropathy caused by the viral illness. We found that the CV4 technique led to the successful remission of the patient’s symptoms. Therefore, we propose craniosacral therapy as a successful single management modality in patients with POTS.

Introduction

Postural orthostatic tachycardia syndrome (POTS) is characterized by an abnormal autonomic nervous system response when a patient goes from a supine to an upright posture, and is a common condition affecting one to three million Americans [1]. In a healthy individual, the autonomic nervous system is activated in order to compensate for the downward displacement of blood [1].

Feasibility and Efficacy of Craniosacral Therapy on Sleep Quality in Fibromyalgia Syndrome: a Pre-Post Pilot Trial

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Background: Sleep disturbance is one of the key symptoms of fibromyalgia syndrome (FMS), which negatively affects the participants' quality of life. Craniosacral therapy (CST) is a gentle manual technique found to have significant effects on pain and function in chronic pain participants. However, limited evidence exists on its effectiveness on sleep quality in FMS participants.

Purpose: To evaluate the feasibility and effectiveness of CST on sleep quality in FMS participants.

Setting: Outpatient physiotherapy department of a hospital in Bangalore.

Participants: Participants diagnosed with FMS.

Research Design: A pre/post pilot trial.

Intervention: Once weekly, 45-minute sessions of CST for 12 weeks. The participants continued the standard medical care prescribed by the physician.

Main Outcome Measure: The sleep quality was evaluated using Pittsburgh Sleep Quality Index (PSQI) at baseline and 12 weeks. The data analysis was carried out using paired *t* test.

Results: 9 out of 10 included participants completed the treatment and were included for analysis. The results of the paired t test showed significant improvement in the global PSQI score ($p = .001$, mean difference = 5.44±3.28, 95% CI = 2.92-7.97), as well as the 5 components of PSQI ($p < .05$).

Conclusion: CST was feasible to deliver with high retention, acceptability, and minimal adverse events. It significantly improved sleep quality in FMS participants along with standard medical care. However, future studies with larger sample sizes and appropriate control groups are required to confirm the findings.

KEYWORDS: chronic pain; complementary therapies; craniosacral massage; fibromyalgia; sleep

INTRODUCTION

Fibromyalgia syndrome (FMS) is a chronic disorder with pain in at least 4 out of 5 regions of the body along with somatic symptoms such as fatigue, waking up unrefreshed, and difficulties in cognition.[1] It is prevalent among 2.7% of the global population.[2] Sleep impairment is one of the core symptoms in FMS participants, which impairs the health-related quality of life.[3,4] Poor sleep is seen in 90% of FMS participants.[5,6] The FMS participants commonly complain of difficulty initiating or maintaining sleep, reduced total sleep time, multiple awakenings at night, feeling unrefreshed and tired on waking up, and lack of deep sleep.[5,7] The objective features of impaired sleep include deprived "slow-wave sleep (SWS)", dominant alpha frequency in "non-rapid eye movement (NREM) sleep", extended "sleep latency", and recurrent switches between sleep phases. It is found that the disruption of synaptic transmission during impaired

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Original Article

Influence of Craniosacral Therapy on Anxiety, Depression and Quality of Life in Patients with Fibromyalgia

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Fibromyalgia is considered as a combination of physical, psychological and social disabilities. The causes of pathologic mechanism underlying fibromyalgia are unknown, but fibromyalgia may lead to reduced quality of life. The objective of this study was to analyze the repercussions of craniosacral therapy on depression, anxiety and quality of life in fibromyalgia patients with painful symptoms. An experimental, double-blind longitudinal clinical trial design was undertaken. Eighty-four patients diagnosed with fibromyalgia were randomly assigned to an intervention group (craniosacral therapy) or placebo group (simulated treatment with disconnected ultrasound). The treatment period was 25 weeks. Anxiety, pain, sleep quality, depression and quality of life were determined at baseline and at 10 minutes, 6 months and 1-year post-treatment. State anxiety and trait anxiety, pain, quality of life and Pittsburgh sleep quality index were significantly higher in the intervention versus placebo group after the treatment period and at the 6-month follow-up. However, at the 1-year follow-up, the groups only differed in the Pittsburgh sleep quality index. Approaching fibromyalgia by means of craniosacral therapy contributes to improving anxiety and quality of life levels in these patients.

1. Introduction

There is an increasing interest in the role of psychological factors in fibromyalgia, and studies have been published on associated psychological variables, psychopathological explanations, assessment instruments and psychological intervention programs [1, 2]. Suhr (2003) considered psychological factors to be important for understanding the subjective and objective cognitive disorders of fibromyalgia patients [3]. Various investigations have centered on the relationship of fibromyalgia with pain, depression, anxiety and quality of life. The Copenhagen declaration in 1992 described psychological patterns frequently associated with fibromyalgia, such as anxiety and depression, and there is a growing interest in this aspect among professionals of different fields [4]. Nevertheless, many authors consider that psychological factors are more frequently the result than the cause of pain and disability in fibromyalgia, and this issue remains controversial [4].

Some symptoms of fibromyalgia are similar to those observed during depression, and antidepressants have been administered to fibromyalgia patients to treat sleep disorders and pain symptoms [4]. Review of the literature on the association between fibromyalgia and depression reveals two divergent research lines. Hudson and others [5] believe that a direct association cannot be established between fibromyalgia and depression, whereas Gruber and others (1996) [6] propose a common etiology for fibromyalgia and depression. Significant differences in psychological state between patients with fibromyalgia and depression were reported in a study on fibromyalgia, pain intensity and duration and psychological alterations; the results of depression and anxiety

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Open Access Case Report

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Craniosacral Therapy Use in Normal Pressure Hydrocephalus

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Abstract

Nearly 700,000 adults in the US have normal pressure hydrocephalus (NPH), but it is often misdiagnosed as Alzheimer's or Parkinson's disease. In fact, a small percentage of people with the disease are properly diagnosed. NPH presents classically with a triad of symptoms: ataxic gait, dementia, and urinary incontinence. Diagnosis and treatment are provided together through a lumbar puncture. However, the only effective treatment that exists is a shunt insertion, which is a highly invasive procedure with uncertain responsiveness. As NPH is primarily diagnosed in those in advanced ages (60s and 70s), adjunctive treatment modalities should be further studied. Here we present a case of a patient diagnosed by a neurosurgeon and neurologist with NPH and a candidate for a shunt insertion whose symptoms substantially improved with one month of osteopathic manipulative treatment. Osteopathic considerations and literature are also reviewed in the broader context of craniosacral treatment.

Categories: Family/General Practice, Neurology, Osteopathic Medicine
Keywords: normal pressure hydrocephalus, hydrocephalus, csf shunt, csf drainage, lumbar puncture, osteopathic manipulative medicine, omm, craniosacral therapy, cv4, venous sinus drainage

Introduction

Normal pressure hydrocephalus (NPH) is highly prevalent, but only 20% cases are diagnosed properly [1]. It is caused by impaired cerebrospinal fluid (CSF) absorption that results in CSF accumulation. It is often idiopathic and most commonly in adults older than 60 years of age. NPH can also occur due to obstruction and fibrosis of subarachnoid villi secondary to inflammatory diseases of the central nervous system, intraventricular hemorrhage, or subarachnoidal hemorrhage. It presents classically with a triad of symptoms: ataxic gait, dementia, and urinary incontinence [2]. Ataxic gait is the most prominent clinical feature, but not all features are always present [3].

Diagnosis of NPH includes an MRI that must show ventriculomegaly without sulcal enlargement. To confirm the diagnosis, a lumbar puncture (LP) is needed. The severity of symptoms must be assessed before and after the LP. The LP would indicate normal or only slightly elevated intracranial pressure. Upon removal of 30-50 mL of CSF, an improvement of symptoms provides confirmation of the diagnosis of NPH. Additionally, the removal of CSF also alleviates symptoms [3].

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Shunt surgery is only recommended for those patients with a high likelihood of responding to shunt surgery through predictive tests due to extraordinarily high failure rates. Nearly 16% of shunts in adults fail over six years [4]. Thus, only a fraction of patients with NPH receive shunt surgery, and only 60%-80% improve following shunt surgery [5]. According to the published study in the journal Neurosurgery in 2005, only 11,000 were treated for NPH [6]. Furthermore, complications include mechanical malfunctions on the shunt, blockages, and infections [3]. Here we present a case of NPH that was diagnosed and referred for shunt surgery. Due to the patient's hesitancy toward an invasive procedure, the patient came to his primary care osteopathic physician seeking an alternative therapy. He was offered craniosacral osteopathic manipulative treatment, which has been proven to influence the flow of CSF. It was performed, and the patient's symptoms noticeably improved as confirmed by the patient and his family.

Case Presentation

A 78-year-old male, who had been a patient of the osteopathic family clinic for over 10 years, presented with his wife to discuss a pre-surgical assessment for the placement of an intracranial shunt. He had a past medical history of diabetes mellitus, hypertension, hyperlipidemia, and a stroke in 2013. The stroke resulted in left hemiparesis affecting the lower extremities more than the upper extremities but was followed by a complete recovery. For the past two years, he developed a progressive short-stepped shuffling gait with hesitancy occurring with turning and swaying only to the right side while walking. Additionally, he described nocturia with increased bladder frequency and urgency and subjective memory difficulty without any mental impairment. The patient ambulated with a cane and stated that his biggest concern was swaying to the right with a fear of falling. He described difficulty in turning and freezing due to this feeling of loss of balance. The patient denied dyskinesias, hallucinations, nightmares, tremors, headache, or nausea. His most

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Scientific/Clinical Article

The Effect of Oscillating-energy Manual Therapy on Lateral Epicondylitis: A Randomized, Placebo-control, Double-blinded Study

Mohammad Reza Nourbakhsh PT, PhD, OCS, Frank J. Fearon PT, DHSc, OCS, FAAOMPT

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Abstract

Symptoms of lateral epicondylitis (LE) are attributed to degenerative changes and inflammatory reactions in the common extensor tendon induced by microscopic tears in the tissue after repetitive or overload functions of the wrist and hand extensor muscles. Conventional treatments, provided on the premise of inflammatory basis of LE, have shown 39–80% failure rate. An alternative approach suggests that symptoms of LE could be due to active tender points developed in the origin of hand and wrist extensor muscles after overuse or repetitive movements. Oscillating-energy Manual Therapy (OEMT), also known as V-spread, is a craniosacral manual technique that has been clinically used for treating tender points over the suture lines in the skull.

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EXPLORE

Volume 3, Issue 1, January 2007, Pages 28-36

Original research

The Impact of Acupuncture and Craniosacral Therapy Interventions on Clinical Outcomes in Adults With Asthma

Lewis Mehl-Madrona MD, PhD [1], Benjamin Kligler MD, MPH [2], Shoshana Silverman MSW [3], Holly Lynton BS [4], Woodson Merrell MD [5]

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Objective

Synergy has been proposed between modalities operating at different levels of action. Acupuncture and craniosacral therapy are two very different modalities for which synergy has been proposed. This study sought to test for such synergy and to determine if complementary therapies would improve pulmonary function and quality of life for people suffering from asthma, as well as reducing anxiety, depression, and medication usage.

Design

Subjects were randomly assignment to one of five groups: acupuncture, craniosacral therapy, acupuncture and craniosacral, attention control, and waiting list control.

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Comparison of Craniosacral Therapy and Myofascial Relaxation Techniques in People with Migraine Headache: A Randomized Controlled Study

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Abstract

Objective: The primary objective of this study was to investigate the impact of myofascial release and craniosacral therapy on the quality of life, pain levels, and range of motion (ROM) in patients with chronic migraine headaches. The secondary aim of this study was to develop a migraine treatment protocol using current craniosacral techniques.

Methods: Patients with chronic migraine in the Neurology Department of ALKU Hospital were randomly allocated to 3 therapy groups: (1) Craniosacral Treatment Craniosacral Techniques (CST) + Medical Treatment (MT) (CST group) (n = 24), (2) myofascial treatment (MFT) (n = 24) + MT (MFT group), and (3) MT (control group) only (n = 26). Visual Analog Scale (VAS) for pain, FONSECA for temporomandibular disorder symptom intensity, 24 Hours Quality of Life Questionnaire Scales for quality of life, and Migraine Disability Assessment Score for impairment, Goniometer for Cervical ROM were used for the disability level. Follow-up scores were collected 4 times: at pretreatment (T0), immediately post-treatment (T1), 1 month (T2), and 3 months after treatment ended (T3).

Results: Changes were found in T0 to T1 treatment results, VAS, and ROM angles between the groups. In intragroup evaluations, 24 Hours Quality of Life Questionnaire changes were observed only in the CST group at T0 to T1 to T2 periods (P = .011) while Migraine Disability Assessment Score scores were significantly changed in all groups. Significant changes were also observed in both VAS scores and FONSECA scores of the CST and MFT groups whereas VAS scores decreased significantly, especially in the T0 to T1 to T2 to T3 periods (P < .05). In the evaluation of FONSECA scores both within and between groups, it was observed that the most significant decrease was in the T2 period and there was a difference between the groups (P = .015).

Conclusion: For the participants in this study, CST and MFT techniques reduced migraine headache, temporomandibular disorder level, drug consumption, and functional disability levels, and increased cervical region ROM. These results suggest that CST techniques could be considered in migraine treatment as one of the clinical practical applications within the framework of a certain protocol.

Keywords: Manual Therapy; Migraine Disorders; Quality of Life.

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Effect of Continuous Touch on Brain Functional Connectivity Is Modified by the Operator's Tactile Attention

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Abstract

Touch has been always regarded as a powerful communication channel playing a key role in governing our emotional wellbeing and possibly perception of self. Several studies demonstrated that the stimulation of C-tactile afferent fibers, essential neuroanatomical elements of affective touch, activates specific brain areas and the activation pattern is influenced by subject's attention. However, no research has investigated how the cognitive status of who is administering the touch produces changes in brain functional connectivity of touched subjects. In this functional magnetic resonance imaging (fMRI) study, we investigated brain connectivity while subjects were receiving a static touch by an operator engaged in either a tactile attention or auditory attention task. This randomized-controlled single-blinded study enrolled 40 healthy right-handed adults and randomly assigned to either the operator tactile attention (OTA) or the operator auditory attention (OAA) group. During the five fMRI resting-state runs, the touch was delivered while the operator focused his attention either: (i) on the tactile perception from his hands (OTA group); or (ii) on a repeated auditory stimulus (OAA group). Functional connectivity analysis revealed that prolonged sustained static touch applied by an operator engaged with focused tactile attention produced a significant increase of anticorrelation between posterior cingulate cortex (PCC-seed) and right insula (INS) as well as right inferior-frontal gyrus but these functional connectivity changes are markedly different only after 15 min of touching across the OTA and OAA conditions. Interestingly, data also showed anticorrelation between PCC and left INS with a distinct pattern over time. Indeed, the PCC-left INS anticorrelation is showed to start and end earlier compared to that of PCC-right INS. Taken together, the results of this study showed that if a particular cognitive status of the operator is sustained over time, it is able to elicit significant effects on the subjects' functional connectivity patterns involving cortical areas processing the interoceptive and attentional value of touch.

Keywords: affective touch; fMRI; insula; osteopathic manipulative treatment; tactile stimuli.

Figures

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Fascia Science and Clinical Applications

Direct measurement of the rhythmic motions of the human head identifies a third rhythm

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ABSTRACT

Introduction: Central to the osteopathic cranial field, and at the same time controversial, is the concept of a unique rhythmic movement believed to originate from a primary respiratory mechanism (PRM). Further, the PRM is reported to manifest as a cranial rhythmic impulse (CRI) on the living human skull. This study explores the rhythmic oscillations of the human head measured directly as physical movements. The aim is to investigate the existence of a third rhythm distinct from the head movements caused by respiratory breathing and arterial pulsing, in an objective and purely experimental study.
Experimental: In 50 healthy individuals, rhythmic oscillations of the head were measured in real-time for 42 min in a supine resting state without any intervention. A newly developed machine for tracking rhythmic movements was used for measurements.
Results: In all individuals, a third rhythm was distinguished as separate from the arterial and respiratory rhythm at all times. The third rhythm was observed as a dynamic physiological phenomenon with a narrow range in resting healthy individuals with a mean of 6.16 cycles/minute (4.25–7.07). The significant contribution to the amplitude of the measured movements was the respiratory breathing and this third rhythm, whereas the contribution from the arterial pulsing were minor.
Conclusion: The present study demonstrates the existence, and normative range of a third physical rhythm detected on the human head. Having developed an objective approach to studying this third rhythm might form the future basis for clinical and physiological studies of craniosacral function and dysfunction.

1. Introduction

A core belief of the whole osteopathic cranial concept is the existence of a rhythmic movement different from the respiratory breathing and the arterial pulse. This new rhythmic movement was named the primary respiratory mechanism (PRM) by Dr. William G. Sutherland, the developer of osteopathy in the cranial field (Sutherland 1939). Since the beginning of osteopathy in the cranial field, the existence and nature of the PRM have created a continually controversial debate in scientific literature and public forums.

A manifestation of the PRM is postulated to be a movement referred to as the cranial rhythmic impulse (CRI) when palpated or measured on the head. Palpation of the CRI is central in the craniosacral evaluation and is used worldwide by a high number of therapists as part of craniosacral assessments concerning Cranio-Sacral Treatments (CST) and in osteopathy in the cranial field. From a scientific point of view, evidence for reliability in craniosacral assessment is not clear. Interobserver agreement is lacking, and palpation studies report on a wide range of CRI's (review in Nielson et al., 2006). A significant source of the criticism and controversy of both the existence and reported range of the CRI in humans is the subjective approach to study the CRI by palpation. An objective approach to study the existence of the CRI was attempted by Dr. Viola Fryman (1971), measuring physical movements on the head directly. The drawback of the direct measurements was a high pressure on the head from the equipment used, and that participants had to hold their breath to exclude respiratory movements. Other studies have used indirect measurements (review in Nielson et al., 2006).

In line with the study of Fryman (1971), we developed a machine to measure rhythmic movements as a direct physical

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Brain rhythms have come of age

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Neuronal oscillations offer access to neuronal operations, bringing microscopic and macroscopic mechanisms, experimental methods, and explanations to a common platform. The field of brain rhythms has become the agora of discussions from temporal coordination of neuronal populations within and across brain regions to cognitive phenomena, including language and brain diseases.

Introduction

Studies of neuronal oscillations are as old as neuroscience itself. Yet, in-depth inquiry of neuronal oscillations had its earnest start only three decades ago. This pivotal change was mainly due to works that focused on the neuronal spike content of the various rhythms, their biophysical and circuit mechanisms, and drug responsiveness, which provided a link to circuit functions and, in turn, to cognitive phenomena. This mesoscopic link created a new platform, the field of "neuronal oscillations," which has become one of the fastest growing disciplines in neuroscience, and allowed for a fruitful conversation between cellular and network neuroscience on the one hand and cognitive, neurology, and psychiatry on the other. The term "brain rhythm" has become a household word beyond neuroscience. Our community has moved from the early critical questions ("Do oscillations exist?" or "Do network oscillations assist brain computation?") to "how" neuronal oscillations contribute to circuit operations and behavior.[1] Now it is time to relate current major challenges of contemporary neuroscience to brain rhythms.

The new problem: Time is neuronal space in the brain

Simultaneity of two (or more) events may be deemed synchronous (i.e., occurring within a defined time interval of an observer) even if the two events occur at vastly different times. For example, action potentials arriving at the same time onto the dendrite of a reader neuron from a nearby and distant neuron exert a cooperative impact on discharge of the reader (target) neuron, even though the spikes in the two upstream neurons were generated tens of milliseconds apart (Figure 1A). Conversely, action potentials that are generated at the same (clock) time in a nearby and distant neuron will arrive to the reader neuron tens of milliseconds apart (i.e., asynchronously; Figure 1B). This observer- or reader-defined synchrony is critical in brain operations. If the action potentials from many upstream neurons arrive within the membrane time constant of the target (reader) neuron (τ: 10–50 ms for a typical pyramidal neuron), their combined action is cooperative because each of them contributes to the discharge of the reader neuron. Action potentials arriving later can only contribute to initiating another action potential. Thus, from the reader neuron's point of view, upstream partners that contribute to its spike discharge constitute a functional assembly (integrated by the membrane time constant), whereas spikes outside this time window can only be part of another assembly.[2] This simple functional measure can thus both integrate and segregate upstream neurons into discrete assemblies, irrespective of whether they are interconnected or not. The entire goal of synchronous cooperation is to have an impact, i.e., trigger an action potential in target neurons. Neurons that achieve this joint impact can be considered as a fundamental assembly. When the reader mechanism can integrate over longer time scales (e.g., NMDA channels or neuronal circuits), several fundamental assemblies can be concatenated.

This reader-centric view becomes of utmost importance when one wants to understand communication across brain regions, such as the hippocampus and neocortex (Figure 1C). Because of the slow communication across neurons via the relatively slow conducting axons and charge time of the neuronal membrane, computation and messaging are not instant but protracted over time. This slow propagation of the activity within and across networks is reflected at the mesoscopic level as "traveling waves."[4] For example, population activity travels from the dorsal to the ventral pole of the hippocampus in half a theta cycle (~70 ms; Figure 1C). Therefore, the question that arises when the entire hippocampus takes part in a particular computation is: how does the neocortical reader integrate (i.e., decode) neuronal messages from the hippocampus? As is the case in human language communication, where even the last word of the sentence can change the meaning of the sentence, the reader structure should know both the beginning and end of each message—in our example, the spikes from the entire hippocampal volume within 70 ms time frames.

For the messages to *become* information, certain requirements must be in place, of which syntactical rules are most important. We should emphasize that separation of networks into senders and receivers serve only didactic purposes. In the complex networks of the brain, most structures are bidirectionally connected and can serve as both senders and receivers, whose functions can change rapidly by shifting the phases of the sender and receiving partners.

activity of time-overlapping transmembrane potentials, brought about by spike-induced postsynaptic currents (synapsembles), any non-physiological alternation of neuronal assembly coordination can also be recovered from in-depth analysis of LFP patterns. Although detection of epileptic activity from LFP is the most frequently used diagnostic tool, nearly all psychiatric conditions may be characterized by some level of "oscillopathy" or "rhythmopathy."[10] The relationship between spike assemblies and synapsembles can be also exploited for controlling computers, robots, or other artificial actuators. The advantage of measuring spatially distributed LFP features is their long-term stability compared to multisite recording of single units, which are sensitive to microscopic movements.

Finally, future works in artificial intelligence may exploit oscillatory networks for computation. This may be a win-win outcome because implementation of evolution-tested network operations may lead to novel predictive-semantic architectures and, in return, may assist neuroscience in discovering generative rules of neuronal patterning, their coding, and decoding abilities.

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DECLARATION OF INTERESTS

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Scientists discover that our brain waves can be sent by electrical fields

Whoa.

PETER DOCKRILL 15 JAN 2016

Most biology students will be able to tell you that neural signals are sent via mechanisms such as synaptic transmission, gap junctions, and diffusion processes, but a new study suggests there's another way that our brains transmit information from one place to another.

Researchers in the US have recorded neural spikes travelling too slowly in the brain to be explained by conventional signalling mechanisms. In the absence of other plausible explanations, the scientists believe these brain waves are being transmitted by a weak electrical field, and they've been able to detect one of these in mice.

"Researchers have thought that the brain's endogenous electrical fields are too weak to propagate wave transmission," said Dominique Durand, a biomedical engineer at Case Western Reserve University. "But it appears the brain may be using the fields to communicate without synaptic transmissions, gap junctions or diffusion."

Running computer simulations to model their hypothesis, the researchers found that electrical fields can mediate propagation across layers of neurons. While the field is of low amplitude (approximately 2–6 mV/mm), it's able to excite and activate immediate neighbours, which subsequently activate more neurons, travelling across the brain at about 10 centimetres per second.

Testing on mouse hippocampi (the central part of the brain associated with memory and spatial navigation) produced similar results, and when the researchers applied a blocking field, it slowed down the speed of the wave.

According to the researchers, this is evidence that the propagation mechanism for the activity is consistent with the electrical field.

"The results indicate that electric fields (ephaptic effects) are capable of mediating propagation of self-regenerating neural waves," they write. "This novel

Tracking fluid flow in mouse brains revealed that norepinephrine drives cleansing in non-REM sleep.

PHOTO: ADRIAN EUGEN CIOBANIUC

NEUROSCIENCE

How a neurotransmitter drives brainwashing during sleep

Pulsating blood vessels push fluid into and out of the brains of slumbering mice

By **Mitch Leslie**

Scientists think sleep is the brain's rinse cycle, when fluid percolating through the organ flushes out chemical waste that accumulated while we were awake. But what propels this circulation has been uncertain. A study of mice, reported this week in *Cell*, suggests regular contractions of blood vessels in the brain, stimulated by the periodic release of a chemical cousin of adrenaline, push the fluid along.

"This is excellent science," says neuroscientist Suzana Herculano-Houzel of Vanderbilt University, who wasn't connected to the study. "They put a number of pieces of evidence together that tell a pretty compelling story."

The scientists also found that the sleep drug zolpidem, better known as Ambien, impedes the blood vessel oscillations and the fluid flow they promote, implying it could hamper cleansing. The finding could help researchers create new sleep aids that preserve this brain-scrubbing function.

The brain lacks the lymphatic vessels that collect and move fluid in other parts of the body. But in 2012, neuroscientist Maiken Nedergaard of the University of Rochester Medical Center and colleagues identified an alternative drainage system in which cerebrospinal fluid, the liquid bathing the brain, seeps through the organ via tiny passages alongside blood vessels, sweeping away metabolic refuse and other unwanted molecules. Fluid flow through this so-called glymphatic system ramps up during sleep, they also reported. Studies from Nedergaard's group and others suggest vigorous glymphatic clearance is beneficial: Circulation falters in Alzheimer's disease and other neurodegenerative illnesses. Some researchers have challenged parts of this picture, however; a 2024 study, for example, suggested waste clearance is actually faster during waking than during sleep.

In the new research, Nedergaard and her team wanted to pin down what keeps cerebrospinal fluid moving through the brain. But studying the mouse glymphatic system often involves anesthetizing the rodents, she says, which is very different from natural sleep. To avoid this problem, the scientists surgically implanted mice with electrodes and fiber optic filaments. Although the rodents are tethered to a set of cables, they can fall asleep normally while researchers track blood volume, electrical activity, and chemical levels and use light transmitted through the fiber optic lines to activate certain groups of neurons.

Previous work showed that levels of the neurotransmitter norepinephrine, which is chemically almost identical to adrenaline and spurs blood vessels to contract, fluctuate rhythmically in the mouse brain, peaking about every 50 seconds. Nedergaard and colleagues found that when mice were in the sleep stage known as non-REM sleep, during which the body's tissues undergo renewal, blood volume in the brain also oscillated, tracking—with more than a half-second delay—the changes in norepinephrine. The connection between the two measures wasn't as tight when the animals were awake or in the other main sleep phase, REM sleep, when memories are consolidated.

By injecting the animals with a fluorescent molecule that can trace the flow of cerebrospinal fluid, the researchers found that its levels, too, varied with norepinephrine levels during non-REM sleep. To gauge whether the blood vessel pulsations propel glymphatic flow, the researchers stimulated the area of the mouse brain that produces the neurotransmitter, artificially speeding up the pulses from every 50 seconds to every 10. They then followed labeled cerebrospinal fluid to show it penetrated deeper into regions near the site of norepinephrine production.

Because the brain is boxed in by the skull, the contraction and relaxation of blood vessels creates a pump that circulates the cerebrospinal fluid, Nedergaard explains. When the vessels clench after a pulse of norepinephrine, cerebrospinal fluid moves in to fill the gap. And when the blood vessels relax, they push the cerebrospinal fluid along.

Norepinephrine may not be the only player, but "we have identified maybe the most important driver of glymphatic flow in non-REM sleep," Nedergaard says. Recent research suggests humans, like mice, show oscillations in norepinephrine release and blood vessel pulsations during sleep, so the same pumping mechanism could be operating in our brains, she notes.

"I do think it's an important advance," says neuroscientist Laura Lewis of the Massachusetts Institute of Technology, who wasn't connected to the study. "It's one of the first insights into a neural circuit that can regulate this process."

Zolpidem could disrupt the mechanism. Other research had shown the drug may alter brain activity during sleep and modify the lengths of different sleep phases, so Nedergaard and her team decided to test the drug's effects in the mice. It diminished the norepinephrine oscillations and reduced penetration of cerebrospinal fluid into the brain.

Zolpidem is a widely used sleep aid, but Nedergaard, Herculano-Houzel, and Lewis agree that the study shouldn't prompt people to stop taking it. Instead, Lewis says, "It should be a priority to look at this medication in human studies" to determine whether the side effects on brain clearance are the same. ■

https://osteodoc.com/research-bibliography/

Many papers on this website!

Science direct Craniosacral research

https://www.sciencedirect.com/search?qs=craniosacral

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