

The Somatic Connection

“The Somatic Connection” highlights and summarizes important contributions to the growing body of literature on the musculoskeletal system’s role in health and disease. This section of *The Journal of the American Osteopathic Association (JAOA)* strives to chronicle the significant increase in published research on manipulative methods and treatments in the United States and the renewed interest in manual medicine internationally, especially in Europe.

To submit scientific reports for possible inclusion in “The Somatic Connection,” readers are encouraged to contact *JAOA* Associate Editor Michael A. Seffinger, DO (mseffingerdo@osteopathic.org), or *JAOA* Editorial Advisory Board Member Hollis H. King, DO, PhD (hhking@ucsd.edu).

Feasibility Study Shows Promising Efficacy of Myofascial Therapy for Urologic Chronic Pelvic Pain

FitzGerald MP, Anderson RU, Potts J, et al. Randomized multicenter feasibility trial of myofascial physical therapy for the treatment of urological chronic pelvic pain syndromes. *J Urol.* 2013;189(1 suppl):S75-S85. doi:10.1016/j.juro.2012.11.018.

Few randomized controlled trials involving physical therapy to manage urologic chronic pelvic pain syndrome (UCPPS) have been completed. To determine whether physical therapy for the management of UCPPS is feasible, the authors conducted a multicenter, single-blinded randomized controlled trial comparing the effects of myofascial physical therapy (MPT) and global therapeutic massage (GTM) in patients with UCPPS or interstitial cystitis. Patients (23 men [49%], 24 women [51%]; median age [range], 43 [22-76] years) from 6 clinical centers were randomly assigned to a GTM group or an MPT group. The GTM group received a full-body Western massage that was applied to the upper and lower limbs, trunk, buttocks, abdomen, head, and neck. The MPT group received connective tissue manipulation of the abdominal wall, back,

buttocks, and thighs as well as myofascial trigger point release to painful myofascial trigger points. The MPT group was permitted to use approved home exercises between weekly therapy sessions. Each group received 10 hour-long weekly sessions of manual therapy with a physical therapist.

Inclusion criteria were clinical diagnosis of a UCPPS, a pelvic pain score of 3 or higher on a 10-point scale, symptoms of abnormal urinary frequency, a National Institutes of Health Chronic Prostatitis Symptom index for men, pelvic pain for at least a 3-month period within the past 6 months, symptoms of UCPPS for less than 3 years, and tenderness to palpation of the pelvic floor on examination. Exclusion criteria were the presence of scars that would likely not respond to manual treatment; positive urine culture within 1 month of initiation of therapy; inability to tolerate vaginal or rectal examination; prior manual treatment for same symptoms of UCPPS; neurologic disorder affecting the bladder; active urethral or ureteral calculi or urethral diverticulum; history of pelvic radiation therapy, tuberculous cystitis, bladder cancer, carcinoma in situ, prostate cancer, or urethral cancer; other debilitating medical conditions; or other potentially severe pelvic abnormalities.

The parameters of measurement were taken at baseline and week 12, which included pain score, urinary urgency, urinary frequency, O'Leary-Sant Interstitial Cystitis Symptom Index, O'Leary-Sant Interstitial Cystitis Problem Index, a 12-Item Short-Form Health Survey, and Female Sexual Function Index.

The global response assessment in the MPT group was higher ($P=.03$) than in the GTM group, and the MPT group showed a decrease in patient-reported symptom scores ($P=.05$). Physician assessment of internal pain or tenderness to palpation showed a similar decrease in tenderness of anterior and posterior pelvic musculature among both groups; however, the MPT group showed more notable relief of internal muscle groups when compared with the GTM group ($P<.05$).

The authors concluded that it is indeed feasible to study the effectiveness of myofascial therapy and massage in patients with urologic chronic pelvic pain, and there may be a greater efficacy of myofascial therapy in certain urologic conditions. The authors are conducting a similar study to determine if their findings could be replicated. (doi:10.7556/jaoa.2015.093)

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Managing Pelvic Neuromusculoskeletal Dysfunction Relieves Chronic Pelvic Pain in Men

Anderson RU, Wise D, Sawyer T, Chan C. Integration of myofascial trigger point release and paradoxical relaxation training treatment of chronic pelvic pain in men. *J Urol.* 2005;174(1):155-160.

Chronic nonbacterial prostatitis (CP) and chronic pelvic pain syndrome (CPPS) can be challenging to manage, but manual therapy may help to provide symptom relief. The authors evaluated a multidisciplinary approach to the management of CP and CPPS in men using myofascial trigger point assessment and release therapy (MFRT) in conjunction with paradoxical relaxation therapy (PRT). A total of 138 men aged 16 to 79 years with CP or CPPS refractory to traditional therapy were treated for a minimum of 1 month with a MFRT/PRT protocol by a multidisciplinary team consisting of a urologist, a physical therapist, and a psychologist.

For the MFRT protocol, the patients were examined by a urologist who identified myofascial trigger points by reproducing symptoms with palpation either at the site or at a nearby anatomic location. The physical therapist then applied therapy to the patients weekly by applying pressure to each location for 60 seconds until the myofascial trigger points were released. Therapy was performed once weekly for 4 weeks and biweekly for 8 weeks thereafter.

For the PRT protocol, patients received 1 hour of relaxation exercises (eg, breathing techniques to relieve anxiety) to decrease their pelvic muscle tension each week for 8 weeks. The patients were encouraged to continue these 1-hour sessions daily at home for a minimum of 6 months.

The patients' symptoms were assessed before and after the interventions using a pelvic pain symptom survey and the National Institutes of Health Chronic Prostatitis Symptom Index, both of which evaluated for pain, urinary symptoms, and sexual dysfunction. A 7-point global response as-

assessment questionnaire was also used to monitor the patients' perceptions of the overall effects of therapy.

Of the 92 patients who completed the global response assessment questionnaire, 66 (72%) reported either marked improvement or moderate improvement in their total pain score, urinary symptoms score, and pain visual analog scale score. Total pain scores decreased a median of 8 points in patients with marked improvement ($P<.001$) and a median of 3.5 points in patients with moderate improvement ($P=.001$). Urinary symptom scores decreased a median of 3.5 points in patients with marked improvement ($P=.001$) and a median of 1 point in patients with moderate improvement ($P=.67$). Pain visual analog scale scores decreased a median of 2 points in patients with marked improvement ($P=.001$).

This cross-sectional case series found that combined MFRT and PRT provided symptomatic relief of CPPS in patients refractory to traditional treatment. Although external validity is limited because of lack of patient standardization, randomization, and a control group, the results of this study demonstrated the potential benefit of managing neuromusculoskeletal components of CP or CPPS in men. We recommend including osteopathic manipulative treatment as an intervention in future randomized controlled trials in this patient population. (doi:10.7556/jaoa.2015.094)

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Manual Therapy Effectiveness for Pediatric Dysfunctional Voiding

Nemett DR, Fivush BA, Mathews R, et al. A randomized controlled trial of the effectiveness of osteopathy-based manual physical therapy in treating pediatric dysfunctional voiding [published online January 11, 2008]. *J Pediatr Urol.* 2008;4(2):100-106. doi:10.1016/j.jpuro.2007.11.006.

The incidence of dysfunctional voiding is 10% in children aged 4 to 6 years and 5% in children aged 6 to 12 years. Dysfunctional voiding is more common in girls than in boys. In a randomized controlled trial, the authors evaluated the effect of manual physical therapy based on an osteopathic approach (MPT-OA) in addition to standard treatment on pediatric dysfunctional voiding. A review of the literature yielded no other studies that assessed the efficacy of MPT-OA in children with dysfunctional voiding.

Children aged 4 to 11 years who were referred to a pediatric urology clinic and had reported voiding dysfunction symptoms for at least 6 months were enrolled in this pilot study. Inclusion criteria were diagnosis of dysfunctional voiding with daytime incontinence or vesicoureteral reflux. Exclusion criteria were children with neurologic, spinal, or urogenital structural anomalies; a history of abuse; and Tanner stage IV pubertal development in girls.

Participants were randomly assigned to a treatment group who received MPT-OA and standard treatment or to a control group who received standard treatment. Standard treatment included medical therapy, behavioral training, lifestyle changes, and hour-long appointments. The treatment group received standard therapy and 4 hour-long weekly MPT-OA treatments, which were individualized on the basis of findings on structural examination. Therapy consisted of gentle mobilizations of joints and muscles along the spine, pelvis, lower extremities, visceral organs, and cranium as indicated. The goal was to improve motion restriction and postural symmetry. The primary outcome measures included

postvoid residuals, urinary tract infection diagnosis, daytime incontinence, dyssynergic voiding, vesicoureteral reflux, and improvement in findings from the initial structural examination.

In total, 21 participants (14 girls [67%], 7 boys [33%]; mean age [range], 6.8 [4.5-10] years) completed the study. The treatment group had improvement in a significantly greater proportion of outcome measures ($P=.008$). The change in subgroup analyses for daytime incontinence and vesicoureteral reflux were not statistically significant but had a positive trend ($P=.065$; $P=.114$). Improvement or resolution of vesicoureteral reflux and elimination of postvoid residual urine were also more prominent in the treatment group. The treatment group had reduced motion restrictions after MPT-OA. In particular, a correction of pelvic asymmetry and lower extremity motion restrictions improved dysfunctional voiding ($P<.002$). The results suggested that MPT-OA can improve outcomes that standard treatment cannot.

This study's findings lend further support to the use of manual therapy for pediatric patients with dysfunctional voiding. A large multicenter randomized controlled trial is the next step in further elucidating the value of MPT-OA in treating pediatric patients with dysfunctional voiding. (doi:10.7556/jaoa.2015.095)

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Advances in Biomechanical Examination of Cervical Spine Manipulation

Buzzatti L, Probyn S, Van Roy P, Cattrysse E. Atlanto-axial facet displacement during rotational high-velocity low-amplitude thrust: an in vitro 3D kinematic analysis. *Man Ther.* 2015:1-7.

European researchers used high-resolution ultrasound-based motion tracking technology to measure motion at the atlantoaxial joint in 20 fresh human cadaver specimens. Their purpose was to expand the understanding of the biomechanical effects of high-velocity, low-amplitude (HVLA) manipulation of the upper cervical vertebrae and relate these data to the risk of vertebral artery dissection during HVLA procedures.

The specimens were taken from 11 female and 9 male cadavers with a mean (SD) age of 81 (11) years. The specimens included the intact spinal cord from T2 to C2 and the head. T2 was stabilized in a mount, and the head was positioned on a head rest much like a treatment table. Sensors were mounted on the transverse processes of C1 and C2 and on the superior nuchal line of the occiput to allow for 3-dimensional analyses. The authors acknowledge that the in vitro preparations did not have all of the soft tissue elements typical of in vivo participants.

Two experienced manual therapists, blinded from the data analysis results, each delivered 3 consecutive left rotation thrusts. A few specimens received right rotational thrusts. The rotational thrust was delivered with the head in flexion and contralateral sidebending. The manipulating hand was placed on the dorsal aspect of the C1 transverse process, the supporting hand was placed around the chin in a locking position, and slight traction was applied with the thrust.

The data showed that the motion registered at the C2 facet ranged from 0.0 mm to 1.9 mm in all 3 axes, with means in each vector of 0.2 mm to 0.3 mm. Only on the x-axis were any notable and reliable induced displacements produced by either manual therapist. The authors concluded that “displacement during execution of HVLA thrust is unintentional, unpredictable, and not reproducible.”

However, the authors suggest that the in vivo displacement of the C1-2 facet motion would be less than the mean of 0.2 mm found in their study and thereby would be unlikely to damage nearby spinal cord or vertebral artery structures. In discussions on the safety of cervical spine manipulation, the data reported in this study may be informative.

Early in my training I was taught to do a rotational thrust without flexion and sidebending for the C1-2 joint so as to avoid any impact on the vertebral artery. It is surprising to me that this technique would still be done in clinical practice, and I would recommend additional investigations before implementing this technique in practice. (doi:10.7556/jaoa.2015.096)

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Manual Therapy Improves Pulmonary Function Acutely

González-Álvarez FJ, Valenza MC, Cabrera-Martos I, Torres-Sanchez I, Valenza-Demet G. Effects of a diaphragm stretching technique on pulmonary function in healthy participants: a randomized-controlled trial. *Int J Osteopath Med.* 2015;18:5-12.

Researchers in the Physical Therapy Department at the University of Granada, Spain, examined the effects of a diaphragm-stretching technique on pulmonary functions in a randomized controlled trial. Eighty-six healthy participants recruited from the university were randomly assigned to an intervention or placebo group. Inclusion criteria were healthy participants of both sexes, age 20 to 50 years, and body mass index lower than 28. Exclusion criteria were back pain or illness in the past week, pregnancy, severe emotional stress, regular use of analgesic or anti-inflammatory medications, caffeine consumption within the past 24 hours, smoking more than 20 cigarettes per day, and manual therapy received within the previous month. Forty-three participants were allocated to the intervention group and 37 to the placebo group.

The outcome measures were obtained before the intervention and 5 and 20 minutes after the intervention—a procedure used in osteopathic medicine that involved stretching of the diaphragm.

The outcome measures were forced vital capacity (FVC), forced expiratory volume in the first second (FEV₁), maximal inspiratory pressure (MIP), and maximal expiratory pressure (MEP). Diaphragm muscle strength is measured by MIP, and abdominal muscle strength is measured by MEP.

The intervention consisted of the practitioner, positioned behind the seated participant, placing his or her fingers bilaterally beneath the costal margins. For 5 to 7 minutes while the participant exhaled, slight resistance traction to exhalation was maintained as the ribs descended fully. The placebo was nontherapeutic ultrasound applied for 7 minutes.

The results showed statistically significant improvement in all outcomes for the intervention group from before to after the procedure (FVC, $P=.006$; FEV₁, $P=.042$; and MIP and MEP, $P<.001$). Also the between-group outcomes were significantly better for the intervention group (FVC, $P<.001$; FEV₁, $P=.031$; and MIP and MEP, $P<.001$). The FVC and FEV₁ improvements maintained at 5 minutes after the intervention, but they slightly declined at the 20-minute assessment.

The authors attributed the improvements to the enhanced elastic capacity of the respiratory muscles and proposed that the procedure may be of value for short-term enhancement of pulmonary function, such as that needed in athletic performance. My clinical experience suggests that the periodic application of diaphragm stretching and other procedures such as rib raising and thoracic lymphatic pump treatment in patients with respiratory disorders, in addition to medication, reduces the morbidity from these conditions. (doi:10.7556/jaoa.2015.097)

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Support for Application of Cranial Osteopathic Manipulative Medicine in Patients With PTSD and TBI

Davis L, Hanson B, Gilliam S. Pilot study of the effects of mixed light touch manual therapies on active duty soldiers with chronic post-traumatic stress disorder and injury to the head [published online March 26, 2015]. *J Bodyw Mov Ther*. doi:10.1016/j.jbmt.2015.03.006.

Researchers at William Beaumont Army Medical Center in El Paso, Texas, were able to assess the impact of light touch manual therapy (LTMT) on soldiers with a diagnosis of posttraumatic stress disorder (PTSD) and head injury. The study participants were recruited from active duty soldiers approved to participate in an intensive outpatient program designed to treat soldiers with PTSD, which included integrative therapies such as acupuncture, reiki, psychotherapy, massage, and psychopharmacologic therapy.

The study took place before the participants were admitted to the intensive outpatient program. Inclusion criteria were self-reported injury to the head at least 2 years before the start of the study. This restriction controlled for the occurrence of spontaneous remission from traumatic brain injury (TBI). Exclusion criteria were shrapnel or prosthetics in the spine or cranium, history of brain surgery, fever, acute systemic infection, previous light touch massage of scalp, inability to tolerate light or moderate pressure on the scalp or body, lactation, or pregnancy.

The 10 participants selected were men between the ages of 27 and 45 years with a diagnosis of PTSD. Ninety percent had a diagnosis of headache and 80% had a diagnosis of TBI. No control group was used. Each participant received two 1-hour LTMT sessions scheduled 1 week apart. In the sessions, the therapist palpated the head and other body regions as customized for each participant. The therapist primarily used craniosacral

therapy and brain curriculum. Approximately 80% of the session was spent on the head, 5% to 15% on the sacrum and lower back, and, for some participants, 5% was spent on the rest of the body.

Outcome measures were drawn from an array of assessment tools available to the military and used in the assessment and management of PTSD. Although almost all of the assessment results showed a decrease in symptoms and an increase in cognitive functions and mobility, the most notable findings were the decrease in self-reports of intensity of headache and intensity of anxiety after the 2 LMTM sessions ($P=.008-.031$). Also statistically significant were the results of the validated PTSD Checklist ($P=.013$) and the validated Patient-Reported Outcomes Measurement Information System scale for pain interference ($P=.039$).

Although limited as a pilot study with no control group, this study shows the potential for similar osteopathic interventions to benefit patients with PTSD and TBI. (doi:10.7556/jaoa.2015.098)

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