The AAO
FORUM FOR OSTEOPATHIC THOUGHT
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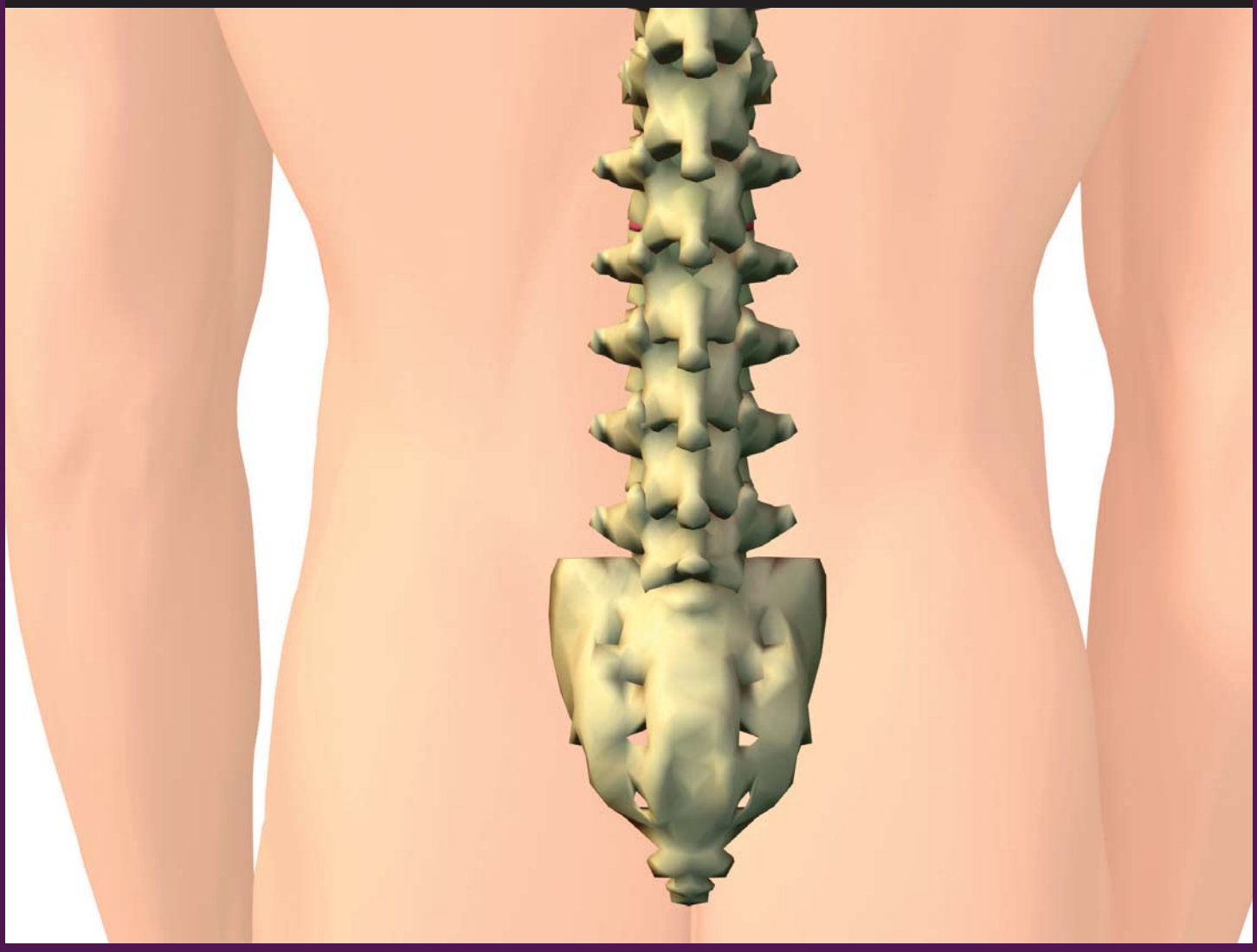
Official Publication of the American Academy of Osteopathy
TRADITION SHAPES THE FUTURE
VOLUME 22 NUMBER 4 DECEMBER 2012



A logical approach to compilcated sacral and innominate dysfunction...pg. 21

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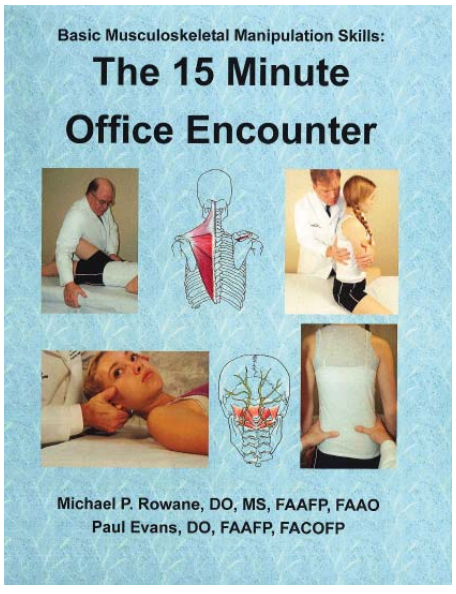
by Michael P. Rowane, DO, MS, FAAFP, FAAO & Paul Evans, DO, FAAFP, FACOFP



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TRADITION SHAPES THE FUTURE • VOLUME 22 NUMBER 4 • DECEMBER 2012

The mission of the American Academy of Osteopathy is to teach, advocate and research the science, art and philosophy of osteopathic medicine, emphasizing the integration of osteopathic principles, practices and manipulative treatment in patient care.

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*Although the primary author is currently a resident, the research detailed in this article was performed while she was a student.

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View From the Pyramids

The Doctor as patient

Murray R. Berkowitz, DO, MA, MS, MPH

On September 16, I suddenly found myself in my local medical center—as a patient! My mind was drawn to William Hurt in his starring role as Dr. Jack MacKee in *The Doctor* (1991). What I thought of was what I could learn as a patient and pass on to my medical students and colleagues.

I was sitting at home with my wife watching television and drinking a can of soda (and for those of you who know me well, yes, it was a can of Dr. Brown's Diet Cream Soda—we had run out of Diet Black Cherry!) when I noticed that my lips on the soda can "felt funny." They felt as they did when I had received Novocaine (procaine hydrochloride) from my dentist. Now, mind you, this was Sunday evening and I had not received Novocaine. I have had Novocaine only once—and that was over 31 years ago! (Yes, I have had my fillings done without any Novocaine). Clearly, this was not a late reaction to Novocaine.

So, I got up from the couch and went to look in the bathroom mirror. I did the raising of the eyebrows, etc., and noticed both my inability to do so and the time on my watch (10:29 pm). My wife drove me to the emergency room (ER) and I presented myself stating, "Hi, I'm Dr. Berkowitz, and my symptoms began 20 minutes ago." So, with left facial droop and only being able to talk out of one side of my mouth, I was admitted to the ER immediately and began the protocol to "rule out" stroke vs. transient ischemic attack (TIA) vs. Bell's Palsy. I had completed the computed tomography (CT) scan by 11:30 pm (yes, we were moving right along); however, the night radiologist noted some things in my left parietal lobe. (Ah, the wonders of telemedicine.) Clearly, these were not consistent with my symptoms and needed further work-up.

Now things got interesting. You see, the local medical center does NOT have a 24-hour magnetic resonance imaging (MRI). Their protocol is that the MRI tech has one hour to report back to the hospital. We all know where I'm headed—when one suspects a possible stroke, you first check to see if it's hemorrhagic vs. embolic/ischemic. Hence, the CT. You have a three-hour window from the time of the onset of symptoms (in case you decide to give tissue plasminogen activator [tPA]). So, you call back the MRI tech (12:30 am), you have 30 minutes to perform the head/brain MRI (1:00 am), and that leaves 30 minutes to decide whether to administer tPA. No problem, BUT…

The only way to have the MRI tech recalled is for the hospitalist to make that call—and that means you have to be admitted as an inpatient. Okay, let's do it, BUT…

The hospitalist does not show up until after 4:00 am. I am told, "[the hospitalist] was running a code." Yes, codes win out, but this code (and everyone in the hospital knew about this code, it was the only one) had started about 2:30 am and lasted 90 minutes—and was successful in bringing back that patient! My response was, "Okay, and where were you for the three hours prior to that?" (As my wife sarcastically points out, "Out to win friends." No, not this time.) The hospitalist then stated that there "were other patients ahead of me on [the hospitalist's] list and that until I'm seen and admitted, I'm not [the hospitalist's] patient."

I was admitted and brought upstairs "to the floor" around 5:00 am. Around 6:30 am, the speech pathologist shows up and tells me she is "here to evaluate me for stroke." So, clearly there was still the suspicion that I might have had a stroke, but we are now five hours past the ability to intervene therapeutically with thrombolytics!

Every one of my medical students—OMS III, OMS II, and yes, even the OMS Is—know that the window for a rule-out stroke protocol is three hours from the onset of symptoms. The first years had not even been in medical school for a full two months yet, and they knew the correct answer. The hospitalist did NOT! I spoke to the Chief of the Hospitalist Service, and he had some fairly lame excuses. I was not interested in hurting this individual's career, but the reality was, had I been suffering an embolic/ischemic attack, things could have gone really badly. Instead of talking to me—as irritated with poor medical care at the hands of a fellow physician as I was—they could have ended up

continued on page 7

Andrew Taylor Still and the Unified Pathway

Kate McCaffrey, DO

To find health should be the object of the doctor. Anyone can find disease.[1]

—Andrew Taylor Still, MD, DO

The essence of Dr. Andrew Taylor Still's teachings was this: the integration of manual medicine into the rest of medical practice. As you know, Dr. Still performed obstetrics and surgery, practiced general medicine and applied manual medicine to increase the health of his patients. I think Dr. Still would have approved of the Unified Pathway for many reasons, not the least of which is the integration of osteopathic manipulative medicine (OMM) into the rest of medicine—his original intent.

The evolution of the current Unified Pathway has been eloquently commented upon by my esteemed colleague in previous editorials in this journal, and they are worth mentioning here as there is a continuum. I would like to reiterate that the mission of the American Academy of Osteopathy is to teach, *advocate* and research the science, art and philosophy of osteopathic medicine, *emphasizing the integration of osteopathic principles, practices and manipulative treatment in patient care*. This mission fits perfectly with the idea behind the Unified Pathway. I would also like to emphasize Dr. Berkowitz's statements about the need for more osteopathic graduate medical programs in the current system.[2,3,4]

The Graduate Medical Education (GME) and Osteopathic Graduate Medical Education (OGME) residency pathways are being merged following a recent agreement between the Accreditation Council for Graduate Medical Education (ACGME), the American Association of Colleges of Osteopathic Medicine (AACOM) and the American Osteopathic Association (AOA). These and other entities are taking the lead in creating a single GME residency match within the United States. This merger will allow graduates of both DO and MD colleges to enter a single lottery, thus simplifying the current choice DO students have between either an AOA or ACGME residency program.

How are DOs different from MDs? In addition to practicing medicine and surgery, DOs treat the somatic dysfunction of a clinical problem within the context of treating the whole person. DOs are trained in a philosophy of health-centered medicine in addition to the traditional model of treating disease. Osteopathic philosophy addresses the interrelationship of structure and function. It views the body as a unit of mind, body and spirit. It proposes the body has an innate ability to heal itself, given the right set of conditions, and applies rational therapy upon consideration of the first three principles.

The facts: There are approximately 1,000 osteopathic residencies and 9,000 allopathic residencies in the U.S. When added together, there are a total of 10,000 residencies—a win-win situation for both professions. Two distinct DO residencies exist: Neuromusculoskeletal Medicine (NMM) and Proctology. There are currently greater than 70,000 osteopathic physicians in the U.S.[5] Twenty-nine U.S. colleges of osteopathic medicine, not including their respective branch campuses and several more in the planning stages,[6] currently train osteopathic medical students.

One of the main benefits of having a Unified Pathway is increased and expanded research opportunities. I am excited just thinking about the potential for future research. The co-mingling of DO and MD residents could further the development of OMM through an expansion in OMM clinical trials and biomedical research. Evidenced-based manual medicine will be further integrated into the full complement of medical practices. Allopathic physicians will have the opportunity to collaborate with other fully licensed physicians (DOs) about osteopathic principles and practice.

Currently, MDs and MD students are allowed to fully participate in osteopathic manipulation continuing medical education (CME) courses. Such courses are offered by the American Academy of Osteopathy, the Cranial Academy, the Sutherland Cranial Teaching Foundation and other component societies. As the two professions continue to walk side by side, they have the opportunity to collaborate on CME topics. Examples of collaborative CME courses include hospital-based OMM, OMM for patients on a ventilator, and OMM in the pediatric, obstetric and geriatric populations. These kinds of courses are supported by evidence-based research as found in research articles and books, such as *Evidenced-Based Manual Medicine: A Problem-Oriented Approach* and *The Science and Clinical Application of Manual Therapy*.[7,8]

The future of osteopathic medicine is up to us. Our ability to use collaborative communication with our MD counterparts is essential to a successful union. My next article will cover the historical aspect of this current decision. Until then, go save lives!

references on page 7

Osteopathic Approach to Clinically Relevant Myofascial Trigger Points

January 18-20, 2013, at AZCOM in Glendale, AZ

Course Description

This course will emphasize linking muscular dysfunction to common clinical complaints, and providing practical approaches to diagnose and treat these complaints using osteopathic principles. It will integrate primary manual techniques (counterstrain, FPR, soft tissue OMT, muscle energy, etc.), and introduce adjunctive release-enhancing maneuvers and modalities (such as vapocoolant spray & stretch) to accomplish therapeutic goals in an osteopathic fashion. Basic principles and anatomical review will be reinforced by discussing direct treatment of a muscle trigger point (e.g., spray & stretch or muscle energy) with an indirect treatment (e.g., counterstrain, FPR).

The course will include a discussion of other non-manual interventions (acupuncture, injections, etc.) and the role of prevention and eliminating perpetuating factors. It will also feature a strong evidence base and a leading NIH-based clinician who researches trigger points. Emphasis on the most clinically relevant trigger points and a practical discussion on billing and coding should be attractive to practitioners and also encourage application of the course content.

Course Location

Arizona College of Osteopathic Medicine
19555 North 59th Avenue
Glendale, AZ 85308
(623) 572-3215

Travel Arrangements

Call Tina Callahan of Globally Yours Travel at (800) 274-5975.

Program Chair

Michael L. Kuchera, DO, FAAO, graduated from Kirksville College of Osteopathic Medicine, where he later served as Chairperson of OMM, OMM Residency Director, Vice President for International Osteopathic Research and Education, Vice President for Academic Affairs and Dean. He then directed the OMM Research and Human Performance and Biomechanics Laboratory at Philadelphia College of Osteopathic Medicine, and was Clinical Director of the Center for Chronic Disorders of Aging. Dr. Kuchera recently took the position of Chair of the OMM Department at Marian Universiy College of Osteopathic Medicine in Indianapolis, IN.

Presenter

Jay P. Shah, MD, is a senior staff physiatrist in the Rehabilitation Medicine Department at the NIH Clinical Center. His research interests include the pathophysiology of myofascial pain and the integration of physical medicine techniques with promising complementary approaches in the management of neuromusculoskeletal pain and dysfunction. Dr. Shah lectures extensively on mechanisms of chronic pain, myofascial pain, acupuncture techniques and other related topics.

CME

20 hours of **AOA** Category 1-A credit is anticipated.

Application for CME credit has been filed with the **AAFP**. Determination of credit is pending.

Course Times

Friday and Saturday: **8:00 am - 5:30 pm** (lunch provided)
Sunday: **8:00 am - 12:30 pm** (lunch on your own)

Registration Form

Osteopathic Approach... Myofascial Trigger Points
January 18-20, 2013

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continued from page 4

speaking with my kid brother (my family's lawyer)! Bell's Palsy was confirmed by the neurologist two days later on an outpatient basis. Those of you who saw me in San Diego did not know unless I told you—I recovered that quickly (whew!).

So, here are the lessons: First, whenever you have a patient with a possible stroke, you only have a three-hour window from the onset of symptoms to evaluate the patient. Second, as soon as you agree to come see a patient, that patient is your responsibility—and all that occurs or fails to occur is your responsibility. Third, stroke is the third highest killer of people. Just as with cardiac events (the number one killer), stroke can kill you now (even cancer, the number two, will not kill you today). Thus, when you suspect a patient may be having a stroke, you have to move that patient to a much higher priority and see him/her immediately. Fourth, the Emergency Department needs to have the ability to recall needed personnel to perform such functions as MRI evaluation in cases of suspected stroke (etc.) and not have to wait for a hospitalist to admit the patient as an inpatient first. Fifth, this medical center needs to have someone come in and provide on-site continuing medical education about this. Sixth, this is a definite risk management issue and needs to be treated accordingly. Finally, don't let your ego stand in the way of *caring for the patient*!

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References

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5 American Osteopathic Association. Growth in Osteopathic Physicians. http://www.osteopathic.org/inside-aoa/about/aoa-annual-statistics/Pages/growth-in-osteopathic-physicians.aspx

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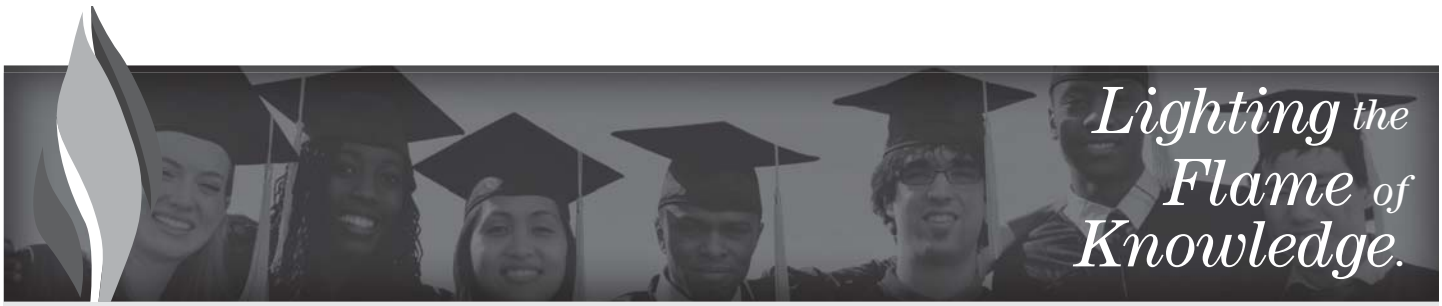

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Faculty Position: Department of Osteopathic Manipulative Medicine

Full time faculty position in the Department of Osteopathic Manipulative Medicine. This individual will be expected to teach osteopathic medical students in both lecture and laboratory sessions in all four years of the curriculum, see patients and develop an outpatient clinic for M-3 month long rotation, plan and supervise OMM Inpatient Student Service, assist in preparation of OMM video clips and tutorials, participate in existing research and initiate new OMM research, assist in planning and production of new publications, and assist in planning and supervision of the OMM Residency. The successful applicant will have a D.O. degree and proficiency in osteopathic manipulative medicine. The candidate needs to have or be eligible for a license to practice Osteopathic Medicine in the State of Georgia. Board Certification or eligibility by the AOBNMM or AOBSPOMM is required. Additional Board Certification or eligibility by the AOBFM is desirable. The review of applications will begin immediately and continue until the position is filled. Salary for this position will be commensurate with experience and qualifications.

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Seeking qualified Osteopathic Physician for a full-time Clinical Education Coordinator. This full time position reports to the Chair of Undergraduate Clinical Education. This individual will be responsible as the Director of the Advanced Clinical Skills Program. He/She will supervise the Clinical Adjunct Facultyís participation in the didactic educational programs and assist the Chair in management of the Clinical Clerkship program. Minimum of five years in a clinical practice. Experience in clinical education as a Clerkship Director, Program Director, Didactic Educator, or similar activities. Must be Board Certified in a Primary Care specialty.

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AAO Calendar of Events 2012-2013

Mark your calendar for these upcoming Academy meetings and educational courses.

2012

December 12	Executive Committee Teleconference, 8:00 pm EST
December 19	Postdoctoral Standards & Evaluation Committee Teleconference, 6:30 pm EST

2013

January 1	AOBNMM Re-Certification applications due
January 1	Fellowship applications due
January 18-20	*Osteopathic Approach to Clinically Relevant Myofascial Trigger Points* Michael L. Kuchera, DO, FAAO—AZCOM, Glendale, AZ
February 1-2	Education Committee Meeting—The Westin Hotel, Indianapolis, IN
February 7	Membership Committee Teleconference, 8:30 pm EST
March 2-9	AOA Mid-year Meeting, Fairmont Kea Lani Hotel, Wailai, Maui, Hawaii
March 4-6	AOA Board of Trustees Meeting, Fairmont Kea Lani Hotel, Wailai, Maui, Hawaii
March 17-19	*Peripheral Nerve: Upper Body* (Pre-Convocation)—Kenneth J. Lossing, DO Rosen Shingle Creek Resort, Orlando, FL
March 18-19	*Treating Children with Common Developmental and Neurological Issues: An International Osteopathic Perspective* (Pre-Convocation)—Jane E. Carreiro, DO—Rosen Shingle Creek Resort, Orlando, FL
March 18-19	*Osteopathic Considerations in Systemic Dysfunction of the Geriatric Patient* (Pre-Convocation) Michael L. Kuchera, DO, FAAO; Hugh M. Ettlinger, DO, FAAO—Rosen Shingle Creek Resort, Orlando, FL
March 20	*Cellular Biology and the Cellular Matrix* (Pre-Convocation)–Frank H. Willard, PhD Rosen Shingle Creek Resort, Orlando, FL
March 20	AOBNMM Written Re-Certification Exam
March 20	Residents' In-Service Exam
March 20-24	AAO Convocation—*Mechanotransduction and the Interstitium: The World in Between* Gregg C. Lund, DO—Rosen Shingle Creek Resort, Orlando, FL
May 17-19	*Palpating and Treating the Brain: The Ventricular System and the Brain Nuclei*—Bruno Chikly, MD, DO AZCOM, Glendale, AZ
June 14-16	*Normalization of Muscle Function*—Jay B. Danto, DO—UMDNJSOM, Stratford, NJ
September 29	*Case-Based Osteopathic Sports Medicine* (Pre-OMED)—Kurt P. Heinking, DO, FAAO—Las Vegas, NV
Sep. 30-Oct. 2	AAO Program at the AOA Convention (OMED)—Laura E. Griffin, DO, FAAO—Las Vegas, NV
October 10-12	*Prolotherapy Weekend*—George J. Pasquarello, DO, FAAO; Mark S. Cantieri, DO, FAAO UNECOM, Biddeford, ME
December 6-8	*Heart and Vascular Course*—Kenneth J. Lossing, DO—AZCOM, Glendale, AZ

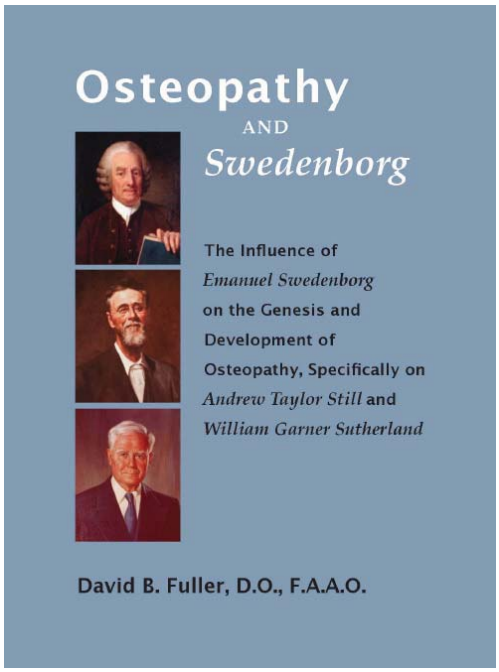
Osteopathy and Swedenborg

by David B. Fuller, DO, FAAO

Now available in the AAO bookstore!

Osteopathy & Swedenborg demonstrates the previously unrecognized influence of Swedenborg's ideas on the creation and development of osteopathic medicine, especially in regards to body/mind/spirit and the anatomical inter-relationship of the nervous system, fascia and fluids throughout the body. This includes a study of cranial osteopathy and Swedenborg's paradigm of the brain and soul-body interaction, comparing concepts such as Swedenborg's spirituous fluid and Sutherland's Primary Respiratory Mechanism.

In the process of making these connections, the book traces the influence of Swedenborg's ideas through and across the America of the 1800s, specifically through the metaphysical/ healing movements of Transcendentalism, Spiritualism, New Thought and Theosophy.



624 pp. Hardback

ISBN: 978-0-910557-82-5

David Fuller's text, Osteopathy and Swedenborg, *is a thorough analysis of the influence the writings of eighteenth-century Swedish scientist and theologian, Emanuel Swedenborg, had on Andrew Taylor Still, William Garner Sutherland and other seminal osteopathic thinkers. It behooves any serious osteopathic practitioner, scholar or educator to read this thought-provoking work.*

—**Kenneth E. Nelson**, DO, FAAO, FACOFP (Dist.), Professor, Department of Osteopathic Manipulative Medicine, Chicago College of Osteopathic Medicine, and Editor of Somatic Dysfunction in Osteopathic Family Medicine

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2013 AAO Convocation / March 20-24, 2013 / Rosen Shingle Creek, Orlando, FL

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MEALS & EVENTS

I plan to Attend: (check all that apply)

Evening with the Stars (3/20) ☐ Incl. in Price

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AAO Annual Business Meeting Lunch (3/21) ☐ Incl. in Price

Extra Lunch Tickets #____ ☐ $50 each

Meal Preference: ☐ Roast Chicken ☐ Grilled Veg. Napoleon

Gavel Club (3/21) Past Presidents & Guests #____ ☐ $50 each

Friday **PAAO** Luncheon (3/22) ☐ Incl. in Price

Menu: Mexican Fiesta Buffet (includes vegetarian options)

Fellows Dinner (3/22) FAAOs & Guests # ____ ☐ $100 each

Meal Preference: ☐ Roast Prime Rib ☐ Veggie Wellington

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Do you utilize Osteopathy in the Cranial Field in your practice? ☐ Yes ☐ No

CONTINUE TO 2nd Page

Name: _____

Physician Workshops

Please number your workshop choices from one to three.

Thursday, March 21
2:30 pm - 4:00 pm

_____ **A1:** *Mentor and Protégé: Updated Muscle Energy Techniques for O-A and A-A Segments - a, b , c, d*; Dr. Mitchell, Dr. Sandweiss and Kai Mitchell

_____ **B1:** *Some of What I Learned from My Mentor, Sara (Sally) E. Sutton, DO, FAAO*; Dr. Schuster

_____ **C1:** *Interface Between the Fascial System and the Fluid System - The Junctional Areas*; Dr. Buser

_____ **D1:** *Breathing and Mechanotransduction*; Dr. Ettlinger

_____ **E1:** *Interface of the Biomechanical, Bioenergetic and Biological in the Fascia*; Dr. O'Connell

_____ **F1:** *Osteopathy Across the Ponds*; Dr. Turner and Dr. Fendall

_____ **G1:** *Mentor and Protégé: Dr. Kappler's Favorite Techniques - Chicago Style*; Dr. Kappler and Dr. Habenicht

Thursday, March 21
4:30 pm - 6:00 pm

_____ **A2:** *Mentor and Protégé: Updated Muscle Energy Techniques for O-A and A-A Segments - a, b , c, d*; Dr. Mitchell, Dr. Sandweiss and Kai Mitchell

_____ **B2:** *Some of What I Learned from My Mentor, Sara (Sally) E. Sutton, DO, FAAO*; Dr. Schuster

_____ **C2:** *Interface Between the Fascial System and the Fluid System - The Junctional Areas*; Dr. Buser

_____ **D2:** *Breathing and Mechanotransduction*; Dr. Ettlinger

_____ **E2:** *Interface of the Biomechanical, Bioenergetic, and Biological in the Fascia;* Dr. O'Connell

_____ **F2:** *Osteopathy Across the Ponds*; Dr. Turner and Dr. Fendall

_____ **G2:** *Mentor and Protégé: Dr. Kappler's Favorite Techniques - Chicago Style*; Dr. Kappler and Dr. Habenicht

Friday, March 22
2:00 pm - 3:30 pm

_____ **A3:** *Mentor and Protégé: Updated Muscle Energy Techniques for O-A and A-A Segments - a, b , c, d*; Dr. Mitchell, Dr. Sandweiss and Kai Mitchell

_____ **B3:** *Some of What I Learned from My Mentor, Herbert C. Miller, DO, FAAO*; Dr. Hagopian

_____ **C3:** *Diagnostic Musculoskeletal Ultrasound*; Dr. Pasquarello and Dr. Jorgensen

_____ **D3:** *An Osteopathic Prospective of the Lymphatics*; Dr. Goldman

_____ **E3:** *Fluid/Cellular Interface*; Dr. Fendall

_____ **F3:** *The Fluid System - Intravascular, Extravascular, Interstitial*; Dr. Hankinson

_____ **G3:** *Magoun Memorial FAAO/NUFA Forum*

Friday, March 22
4:00 pm - 5:30 pm

_____ **A4:** *Mentor and Protégé: Updated Muscle Energy Techniques for O-A and A-A Segments - a, b , c, d*; Dr. Mitchell, Dr. Sandweiss and Kai Mitchell

_____ **B4:** *Some of What I Learned from My Mentor, Herbert C. Miller, DO, FAAO*; Dr. Hagopian

_____ **C4:** *Diagnostic Musculoskeletal Ultrasound*; Dr. Pasquarello and Dr. Jorgensen

_____ **D4:** *An Osteopathic Prospective of the Lymphatics*; Dr. Goldman

_____ **E4:** *Fluid/Cellular Interface*; Dr. Fendall

_____ **F4:** *The Fluid System - Intravascular, Extravascular, Interstitial*; Dr. Hankinson

_____ **G4:** *Component Society Forum*; Dr. Coffey

Saturday, March 23
11:30 am - 1:30 pm

_____ **A5:** *Mentor and Protégé: Dr. Kappler's Favorite Techniques - Chicago Style*; Dr. Kappler and Dr. Habenicht

_____ **B5:** *Some of What I Learned from My Mentor Edna Lay, DO, FAAO, on the Work of Dr. Sutherland*; Dr. Tettambel

_____ **C5:** *EMF as an Approach*; Dr. Lossing

_____ **D5:** *Primary Respiration in Interstitium*; Dr. Lee

_____ **E5:** *Exploring the Interaction Between the Attitude of the Clinician and the Physiology of the Patient*; Dr. Turner

_____ **F5:** *Faculty Development Workshop: 1) The Learner in Difficulty; 2) Using Innovative Osteopathic Curricular Tools; 3) Procedural Teaching Pearls in Osteopathic Manipulative Medicine: Beyond 'See One, Do One and Teach One;'* Dr. Jones, Dr. Rowane and Dr. Schwalenberg

Saturday, March 23
3:00 pm - 5:00 pm

_____ **A6:** *Mentor and Protégé: Dr. Kappler's Favorite Techniques - Chicago Style*; Dr. Kappler and Dr. Habenicht

_____ **B6:** *Some of What I learned from My Mentor Edna Lay, DO, FAAO, on the Work of Dr. Sutherland*; Dr. Tettambel

_____ **C6:** *EMF as an Approach*; Dr. Lossing

_____ **D6:** *Primary Respiration in Interstitium*; Dr. Lee

_____ **E6:** *Exploring the Interaction Between the Attitude of the Clinician and the Physiology of the Patient*; Dr. Turner

_____ **F6:** *Faculty Development Workshop: Best Practices in Examination Item Writing for the Application of Osteopathic Principles and OMM*; Dr. Gimpel and NBOME Staff

_____ **G6:** *EMT and OMT: The Same Old Battle in a New and Changing Reimbursement Environment*; Dr. Jorgensen

Osteopathic diagnosis and treatment of sacral fracture: A case study

Amy L. Dean, DO

Abstract

Sacral fractures are often missed or identified late, resulting in decreased mobility, painful deformities and loss of neurological function. Even in treated sacral fractures, persistent pain and non-union of the fracture can occur. This case describes a patient who presented with severe sacrococcygeal and gluteal pain following a fall. Osteopathic examination revealed a fifth sacral segment fracture confirmed by radiography. Osteopathic treatment and internal reduction of the sacral fracture resulted in full resolution of the patient's pain.

The purpose of presenting this case is to provide evidence that osteopathic exam findings can accurately detect and diagnose sacral fractures and that osteopathic treatment is an effective treatment for sacral fractures. Further research is needed to correlate osteopathic examination findings with diagnostic imaging and to confirm the efficacy of osteopathic treatment of sacral fractures.

Keywords: sacral fracture, osteopathic manipulation, osteopathic exam, osteopathy, case study

Introduction

Sacral fractures often result from motor vehicle accidents, falls and crush injuries.[1,2] They are seen in 45 percent of all pelvic fractures, but less than five percent occur from isolated sacral trauma.[1] Transverse sacral fractures are exceedingly rare, comprising only three to five percent of all sacral fractures.[2] Motor vehicle accidents cause 37 percent of all transverse sacral fractures, while falls and suicide attempts cause 35 percent and 25 percent respectively.[2] In general, sacral fractures often go unrecognized and nearly 30 percent are identified late, which can result in painful deformities, decreased mobility and progressive loss of neurological function, including saddle anesthesia and bowel-bladder disturbance.[1,2,3]

Patients with sacral fractures may present with low-back or gluteal pain and bowel or bladder incontinence, as well as lacerations, bruising, tenderness, swelling and crepitus in the fracture region.[3] Conventional radiography, computed tomography (CT) or magnetic resonance imaging are used to identify sacral fractures, although these fractures are often difficult to identify on plain radiographs.[4,5]

Sacral fractures are classified by the Denis classification system into Zones I, II and III.[5] Zone I fractures are lateral to the neural foramina, Zone II fractures pass through the foramina, and Zone III fractures are medial to the foramina and involve the spinal cord. Transverse fractures are classified as Zone III fractures because they pass through the spinal canal and often through all three zones.[5]

Many sacral fractures, including non-displaced fractures, can be treated non-operatively.[5] The medical literature regarding non-operative treatment includes prolonged bed rest, brace immobilization and protected weight bearing.[3] Two to four months healing time is usually required for fracture union, which occurs 85 to 90 percent of the time.[3] However, residual pain is present in 30 percent of patients.[1] Furthermore, a review of the literature revealed no published work regarding osteopathic treatment of sacral fracture.

This case describes a patient who presented with acute sacral and coccygeal pain immediately following a fall. Transverse fracture of the fifth sacral segment was diagnosed with osteopathic examination of the patient and confirmed by radiography. The patient was treated using osteopathic manipulation, which resulted in complete resolution of the patient's pain.

Case Report

History of Present Illness

A 74-year-old male, who was an established clinic patient, presented with complaints of severe pain in the lower sacrococcygeal and left gluteal region, which began immediately following a fall the preceding day. The patient had stepped backward off a ramp two feet above the ground and landed on his buttocks. His pain was exacerbated by movement, sitting and lying supine. He denied bladder or bowel incontinence. He denied any new onset of sensory or motor disturbance in the lower extremities.

Past Medical History

The patient had a history of amyotrophic lateral sclerosis (ALS) diagnosed one year prior, with progressive motor weakness in all extremities. He had a history of controlled atrial fibrillation, hypothyroidism and benign prostatic hypertrophy.

Past Surgical History

The patient underwent open meniscectomy on his left knee in the late 1960s. He underwent cardiac ablation surgery 13 years prior, which was successful in controlling his atrial fibrillation. Failed prostate laser surgery followed by transurethral resection of the prostate was conducted seven months prior for benign prostatic hypertrophy.

Social History

The patient was a retired chemical engineer. He had a remote history of tobacco use and did not use alcohol or recreational drugs.

Family History

His mother's medical history was significant for arthritis. His father's history was significant for prostate cancer.

Medications

The patient had started riluzole 50mg daily for ALS two weeks prior. He was taking Armour thyroid 60mg daily.

Physical Exam

Vital signs were within normal limits. The patient's gait was unchanged from previous visits. He had good range of motion in all extremities. Muscle strength was unchanged from previous examinations. General listening (motility testing) on osteopathic examination revealed the primary lesion to be in the posterior pelvic area. Local listening further revealed a sacral lesion in S5. In addition, a thermal projection was detected over the fifth sacral segment. Fascial listening of the S5 segment exhibited translation of the superior and inferior segments of S5 in opposite directions, indicative of a sacral fracture. The left sacrotuberous ligament demonstrated a lack of distensibility. Decreased mobility and motility of the left sacroiliac joint was observed. Paraspinal muscle spasm was palpated from L2 to L5 bilaterally.

Treatment

First, the patient's left sacrotuberous ligament was released using indirect myofascial release. Lumbar paraspinal spasm was treated using direct inhibition. The left sacroiliac joint was released using cranial technique.

The patient was then sent for pelvic and sacral radiography. The lateral view of the sacrum revealed a non-displaced fracture through the fifth sacral segment (Figure 1). No other fractures were identified. Degenerative changes were seen bilaterally in the sacroiliac and lumbar spine facet joints. Mild periarticular calcifications of the hip joints were noted as well.

The patient returned in one week and reported mild improvement in pain. On examination, the thermal

Figure 1. *Radiograph lateral view of sacrum - fracture noted by arrow*

projection over S5 and fascial translation of the superior and inferior segments of S5 in opposite directions remained. Decreased range of motion of the right talotibial joint was found. Right ribs 5 through 8 exhibited exhalation somatic dysfunction.

The right talotibial joint was released using indirect and direct myofascial release. Rib somatic dysfunction was treated using muscle energy technique. The patient was prepped for intrarectal manipulation using sterile technique. Trigger points were palpated intrarectally in the pelvic floor muscles and were treated using direct inhibition technique. Somatic dysfunction was found in the rectoprostatic fascia and was treated using indirect and direct myofascial release. The sacral fracture was first treated using cranial technique. Then, indirect and direct myofascial release was used to treat and reduce the sacral fracture. Following internal reduction of the sacral fracture, fascial translation above and below the fracture resolved, and significant normalization of cranial motion occured in the sacrum, lumbar spine and thoracic spine.

Two weeks later, the patient returned and reported an 80 percent improvement in pain. Re-examination revealed that local listening, thermal projection and fascial translation had resolved in the sacral region. General listening, followed by local listening, revealed the primary lesion of this visit to be an externally rotated right hip that was treated with balanced ligamentous tension. Four weeks following this last treatment, the patient reported complete resolution of his pain.

Discussion

As sacral fractures are often overlooked and identified late,[1] it has been recommended that all patients with pelvic pain be screened for sacral fracture.[3] As previously mentioned, late identification of sacral fracture can result in painful deformities, decreased mobility and loss of neurological function.[1,2,3] This case demonstrates that osteopathic examination can effetively identify sacral fractures, which may increase their identification and improve patient outcome. Reproducible findings specific to sacral fractures have been reported by Lossing.[6] These include the presence of a thermal projection over the fracture, local listening (motility testing) into the fracture itself, and fascial translatory motion of fracture segments in opposite directions above and below the fracture. Additionally, McGrath reported pronounced lumbar musculature spasm on osteopathic examination of a patient with sacral fracture identified by bone scintigraphy and CT scan.[7] The fact that both his patient and this patient exhibited lumbar musculature spasm may indicate that it is a concomitant finding with sacral fractures.

This case also demonstrates that Osteopathy can be an effective treatment for sacral fractures. Osteopathic treatment may significantly benefit patients with sacral fracture by reducing persistent pain, promoting fracture union and accelerating healing time. Lossing reported that with osteopathic treatment of more than 600 cases of sacral fracture, 85 percent reported improvement of their subjective pain, 100 percent were noted to have improvement in structural findings and three percent reported worsening of pain.[6] Lossing also reported that if the treated sacrum stayed stable for four months following treatment, 95 percent remained stable even after five to eight years on re-examination.[6] Even though no studies have been published on the internal treatment and reduction of sacral fracture, a randomized controlled study by Maigne found that intrarectal treatment of chronic coccyx pain was more effective than the control treatment.[8]

Although this case appears to be the first published report regarding the osteopathic diagnosis and treatment of sacral fracture, it did have limitations. It is a case study and not a randomized controlled trial. Also, it is possible that this patient's pain would have resolved without osteopathic treatment. However, specific osteopatic examination findings of sacral fracture were confirmed by radiography and the patient's greatest improvement in pain was following the internal manipulation and reduction of the sacral fracture.

Conclusion

This study describes a patient who presented with acute sacrococcygeal and gluteal pain following a fall. He was diagnosed by osteopathic exam with a sacral fracture of S5. Radiography confirmed the presence of a Denis type III transverse sacral fracture. The patient was treated osteopathically, and experienced a complete resoluton of pain following three osteopathic treatments.

Research is needed to further study the correlation of osteopathic exam with diagnostic imaging. In addition, research regarding the osteopathic treatment of sacral fracture would confirm its treatment efficacy for transverse sacral fractures and other types of sacral fracture.

This case demonstrates that osteopathic diagnosis and treatment is effective in the identification and treatment of sacral fracture.

References

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Peripheral Nerves: Upper Body

March 17-19, 2013 at Rosen Shingle Creek in Orlando, FL

Course Description

This Level 4 course will examine the peripheral nerves of the upper body per Jean-Pierre Barral, DO. It will explore/cover:

- the general anatomy, vascular supply, innervation, axonal transport, mechanical aspects, lesions, and trauma.
- palpation methods, evaluation, effects of treatment, indication, contraindications, and treatment approaches.
- the cervical plexus, brachial plexus, accessory nerve, suprascapular nerve, axillary nerve, radial nerve, musculoskeletal nerve, medial cutaneous nerve of the forearm, median nerve, and ulnar nerve.
- the innerevation of the shoulder girdle, elbow joint and wrist. Time permitting, we will also cover the costal nerves.
- the decrease in range of motion with nerve dysfunction (for instance in the shoulder area) and see improvement with treatment.

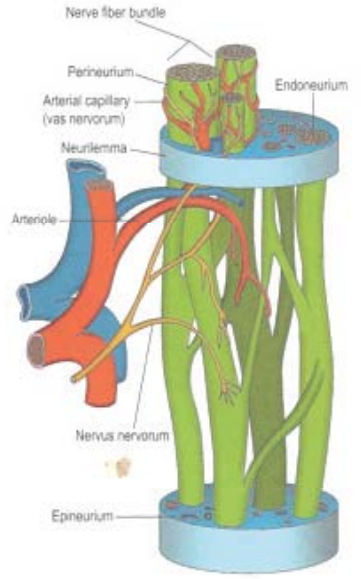

Fig. 1.21 Composition of a peripheral nerve (after Gauthier-Lafaye).

CME

24 hours of AOA Category 1-A credit are anticipated.

Program Chair

Kenneth J. Lossing, DO, is a 1994 graduate of Kirksville College of Osteopathic Medicine. Dr. Lossing completed an internship and residency program at the Ohio University College of Osteopathic Medicine. He studied under the French Osteopath, Jean-Pierre Barral, DO, and has become an internationally known speaker on visceral manipulation. Dr. Lossing is a member of the AAO Board of Trustees.

Course Times

Sun., Mon. and Tues.: **8:00 am - 5:30 pm**
Breakfast and lunch on your own, coffee provided

Course Location

Rosen Shingle Creek Hotel
9939 Universal Boulevard, Orlando, FL 32819
You may call the 24-hour reservations line at 1-866-996-6338 or **make your reservation online**.

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March 17-19, 2013

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Investigation into the role subject foot position has on the assessment of the Seated Flexion Test and a test of inter-rater reliability

Marcelina Jasmine Silva, DO; Chris Boudakian, DO; Raymond Hruby, DO, MS, FAAO

Abstract

Objective

The present study was designed to investigate the following: 1) whether the position of a subject's feet (dangling freely versus fixed upon the floor) during the Seated Flexion Test (SFT)—a diagnostic test taught to osteopathic students to assess for pelvic dysfunction—makes a difference in the outcome of the SFT results; 2) the inter-examiner reliability of the SFT between two qualified examiners; and 3) the role examiner agreement on posterior superior iliac spine (PSIS) landmark prominence plays in inter-examiner reliability.

Methods

Two predoctoral Osteopathic Manual Medicine teaching fellows assessed the SFT on the same 49 subjects in two different positions: one with the subjects' feet fixed to the floor and the other with the subjects' feet dangling freely. The data was then analyzed to test for intra-examiner reliability between the two positions, inter-examiner reliability for both the two positions, and inter-examiner reliability between the two positions. The effects of agreement of PSIS prominence were also incorporated into the inter-examiner reliability investigation to assess whether such a factor influenced the results.

Results

There was no difference in the outcome of the SFT with respect to position when the intra-examiner results were analyzed. There was a statistical difference in inter-examiner reliability between the two positions. However, inter-examiner reliability on the whole was low. There was fair agreement between the examiners with the subjects' feet stabilized, as well as with the subjects' feet dangling freely. (We interpreted strength of agreement between examiners based on the following scale proposed by Landis and Koch:[18] ≤0= poor, .01–.20= slight, .21–.40= fair, .41–.60= moderate, .61–.80= substantial, and .81–1= almost perfect). Agreement on PSIS prominence was substantial, and did not effect inter-examiner reliability.

Conclusions

There is no statistical difference in the intra-examiner determination of the SFT evaluation in regards to a patient's foot positioning. The SFT had poor inter-examiner reliability, even when examiners agreeed on landmark PSIS prominence.

Introduction

This study was intended to investigate the proper way to perform the SFT—a commonly taught maneuver that is a component of the complete osteopathic structural examination.[1,2,3,4,5,6] The SFT is taught to all osteopathic physicians (DOs) during the first year of their osteopathic education. Historically, DOs are taught that this maneuver should be performed with the patient seated comfortably on a chair or stool and the patient's feet flat on the floor. However, many DOs perform this maneuver with the patient seated on an examination table and the feet dangling freely. Anecdotally, DOs have observed that whether the patient's feet are flat on the floor or dangling freely does not seem to affect the results of this diagnostic maneuver. However, with the exception of Kappler's study,[7] which lacked examiner blinding and inter-examiner reliability testing, little scientific investigation into the nature of this phenomenon has been done.

Although the original concept of diagnosing sacral dysfunction via the SFT has been attributed to Harrison Fryette, DO, Fred Mitchell, Sr., DO, FAAO, is frequently refered to as the first to describe the SFT in full in 1958—a description often refered to in osteopathic literature as "The Mitchell Model."[8,9]

> Position the patient seated with feet flat on floor, knees at right angles and apart sufficient to allow shoulders to come between them in forward bending. Have patient bend forward, reaching for the floor with his hands. [The examiner is to] place thumbs over posterior superior iliac spines (PSIS) and have the patient bend forward. Note if posterior superior spines do not move, allowing the sacrum to freely extend, or if it is locked (dysfunctional), thus carrying the (PSIS) superiorly.[2]

While the SFT has long been accepted as an integral part of the osteopathic structral exam, and is a basic skill that DOs begin practicing at the beginning

of their osteopathic training, the problem of consistent diagnostic interpretation between SFT examiners has been aknowledged with varying degrees of poor reproducibility reported.[5,10] The literature, thus far, demonstrates 50 percent or less inter-examiner reliability among physical therapists[11,12] and a slight improvement in inter-examiner reliability among senior DO students with pre-test consensus training.[13] This study intends to contribute to the body of evidence discussing SFT inter-examiner reliability among DOs. Our expectation is that the outcome of this study will assist osteopathic educators and practitioners to: understand whether patient positioning makes a difference in the clinical interpretation of the SFT; know the correct way to teach this maneuver to osteopathic medical students; better understand the reproducability of this maneuver based on the inter-examiner reliability results; and better understand the contribution decidedly prominent PSIS landmarks can make on inter-examiner agreement of the SFT.

Methods

Consensus training between the two examiners was performed during a one-hour session that entailed locating and palpating PSISs and evaluating the SFT together on three practice subjects. The terms of prominent versus non-prominent PSISs, and negative, unilateral positive and bilateral positive SFT results were discussed and agreed upon. Prominent PSISs were defined based on ease of determining location and the presence of well-defined margins. During the exam, if one PSIS traveled further superior than the other, the test was considered positive, with dysfunction on the ipsilateral side. If neither PSIS demonstrated excursion, the test was considered negative. If both PSISs traveled equidistant, the test was considered positive bilaterally.

Volunteers for the study self-selected from the Western University student body by responding to e-mails and broadcast announcements during laboratory sessions. Potential subjects were screened for eligibility by the investigators and asked to sign an informed consent for participation in the study. Any subject over the age of 18 years old who could safely and comfortably bend forward from the hips while seated was eligible for inclusion in the study. Subjects were excluded for pregnancy, history of pelvic, femoral or tibial fracture, lower extremity amputation, hip or knee joint replacement, or any disease that pathologically inhibits lumbar or lower extremity physiologic motion (e.g., ankylosing spondylitis). Anyone who was unable to comfortably or safely bend forward from the hips while seated due to sensations of vertigo or dizziness was also excluded.

Procedure

Each examiner performed the SFT twice on each subject alone in a laboratory—once with the patient seated comfortably on a chair or stool and the patient's feet flat on the floor in such a way as to have the knees at 90 degrees (verified with a goniometer), and once with the patient seated on an examination table with the feet dangling freely. During the exam, patients were instructed to reach between their knees toward the floor and continue flexing forward until the point just before their ischia were no longer in firm contact with the table, or just short of feeling unstable. Examiners sat behind the subjects and placed their thumbs on the inferior aspects of the PSISs to monitor PSIS excursion. The full description of the seated flexion test as used in this study is shown in Figure 1.[17] Examiners also took note of whether the subject's PSISs were prominent at this time. Once the examiner had done his or her testing, he or she would leave the room for the other exainer to enter and test the same subject. This way, examiners were blinded to each other's results. Subjects also did not run the risk of activity changing their diagnoses, as they remained seated on the same exam table between the two examiners' evaluations. Examiners alternated between being the first to examine every other subject.

Because blinding was not possible for the examiners during the intra-examiner evaluation of the second position of the SFT, we chose to compare the outcomes of the two different positions between the two different examiners to obtain data for a blind comparison between the two positions. Prior to the exam, the subjects were instructed to randomly choose a color code to give to each examiner to allow for random blind comparison between feet stablized (blue) for one examiner and feet dangling (red) for the other examiner on the same patient. Thus, in addition to the results of the two different positions of Examiner A being compared to each other and also with the two different results of Examiner B, the result of Examiner A for Subject 1 with feet stablized (blue code) was compared to the result of Examiner B for Subject 1 with feet dangling (red code) in order to blind for the inter-examiner comparison of the two different SFT positions on the same subject.

Results

Forty-nine (49) participants of both genders (49 percent female), ranging in age from 22 to 40 years old, met the inclusion criteria and were examined by two different examiners.

Intra-examiner analysis of the positional difference of the feet stabilized compared to the feet dangling was performed using the Wilcoxon Test. There was no statistical difference in the outcome of the SFT in respect to position between either examiner when the intra-examiner results

were analyzed (Z= -0.412 and P= 0.680 for Examiner A; Z= -0.109 and P= 0.913 for Examiner B).

When the results of the two different positions were compared between the two examiners, as in Examiner A's results with feet dangling compared to Examiner B's results with the feet fixed, there was a statistical difference in the interpretation of the SFT (Z= 3.168 and P= 0.002). A similar difference was seen when the examiners' exams were reversed, with Examiner B assessing the SFT with the subjects' feet dangling compared to Examiner A's assessment of the feet stabilized (Z= -2.69 and P= 0.007).

However, when inter-examiner reliability was assessed between the two examiners for the same exam positions on the same subjects, agreement was low. With the feet stabilized, the examiners agreed 30.4 percent of the time, which translates into 8.1 percent of the time when Cohen's kappa is applied. When the feet were dangling, the raw agreement score was 27.1 percent, translating into 2.1 percent with Cohen's kappa.

The variable of PSIS prominence was also taken into account statistically. The examiners agreed on prominence 65.3 percent of the time. When inter-examiner reliability was considered in tandem with agreement on PSIS prominence, agreement was still low whether the feet were dangling (kappa= 0.035) or fixed (kappa= 0.120). Inter-examiner agreement on exams in the same position was similarly low without agreement on PSIS prominence (kappa feet dangling= 0.036 and feet fixed 0.091). This did not make the agreement of PSIS prominence a determining factor in inter-examiner reliability of SFT results.

Discussion

In some respects, the intra-examiner analysis of this study reproduced what Kappler found, where his raw data showed his SFT assessment did not change 97 percent of the time depending on subject position.[7] This study attempted to challenge Kappler's result further by having two examiners, neither of whom found subject foot position to affect the SFT outcome. However, when measuring intra-examiner assessment of the effects of position on SFT outcome, it has not been possible in the studies conducted to date to eliminate the possibility for examiner bias or expectation affecting outcomes.

In this study, an attempt was made to eliminate the bias inherent in the intra-examiner data by comparing the data from two separate positions and two separate examiners who were blinded to the other's results. The analysis of the SFT outcome based on positional assessment between the two examiners was statistically different, which would argue against the results of the intra-examiner assessments if the inter-examiner reproducibility on the whole had not been so low.

While inter-examiner reproducibility has been postulated to be low throughout manual therapy literature, a paucity of evidence exists to statistically describe the reproducibility of the SFT by DOs. This study attempted to add objective data to the body of evidence surrounding DO inter-examiner reliability of the SFT. This study produced poor inter-examiner reproducibility (raw score less than 31 percent), which is even lower than expectations put forth by other authors. However, this study also included the additional category of bilateral positive for a possible SFT diagnosis, which is a rarely discussed SFT result.[14] This may account for further dilution in agreement between examiners in this study compared to statistics from previous studies. Also possibly contributing to the lower than expected inter-examiner agreement of the SFT in this study is the fact that many studies used different versions of the SFT, such as asking subjects to flex forward as far as they could,[11] or reaching forward until their hands touched the floor.[8] Previous studies have found that prior training to prepare researchers for a specific study will increase inter-examiner reproducability.[13,16] This principle was carried into the current study in an attempt to maximize inter-examiner reproducibility.

Previous studies have postulated that poorly defined anatomic landmarks can contribute to low inter-examiner reproducibility.[15] This study attempted to circumvent that challenge by assessing inter-examiner reproducibility in the context of those subjects where both the examiners agreed on well-defined PSISs as anatomic landmarks. This agreement produced no significant change in reproducibility of SFT results in subjects decided to have prominent PSIS compared with those who did not. One could argue that there was no verification that the examiners were palpating the same prominent structures when determining prominence. Perhaps one or both examiners were not actually palpating the PSIS.

Conclusion

The classical tenant of the necessity for patient feet stabilization during the SFT appears to be refuted by our data in terms of intra-examiner reproducibility. However, such a claim could be tempered by the fact that there was no blinding means to control for intra-examiner bias. Thus, it cannot safely be said that the same examiner would diagnose a single subject the same way in the two positions if the examiner's recollection of the diagnosis in the alternate position were erased.

The closest this study design could achieve toward comparing blind assessments of the two different positions was to compare the results of the two different examiners in the two different positions. This led to a result of poor inter-examiner reproducibility between the two positions. However, such a result could be completely explained

by the poor inter-examiner results achieved between the two examiners when assessing the same position on the same subject. It was postulated before the experiment that agreement on prominence of PSIS would contribute to a greater amount of inter-examiner reliability in SFT assessment, but whether it was agreed upon that this landmark was prominent or not seemed to have no effect on the inter-examiner reproducibility of the SFT.

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The Seated Flexion Test

1. The patient sits on a stool with his/her feet flat on the floor, or on a treatment table with feet dangling freely and the knees comfortably apart. The subject holds a wedge pillow on his/her lap. The pillow serves as a way of ensuring the subject will forward bend approximately the same amount in both testing positions.
2. The physician sits or kneels behind the patient and places his/her thumbs on the inferior slopes of the patient's posterior superior iliac spines (PSISs).
3. The examiner notes whether the PSISs are level or unlevel in the horizontal plane.
4. The patient is then asked to bend forward from the waist with his/her arms hanging loosely between the knees.
5. The physician observes whether the PSISs are level or unlevel in the horizontal plane at the end of the patient's forward bending.

This test screens for sacroiliac somatic dysfunction, defined functionally as somatic dysfunction of the sacrum or lower lumbar spine. If the PSISs are symmetrical at the end of the patient's forward bending, this is considered normal motion and the test is negative. If one PSIS is more superior and/or ventral than the other at the end of the forward bending motion, this is a positive test on the side of the more superior and/or ventral PSIS. A positive seated flexion test is indicative of possible somatic dysfunction in the sacral region or in the lower lumbar vertebrae on the side of the positive test.

***Figure 1**. Description of the seated flexion test as used in this study.*

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Meet the Faculty

Jane E. Carreiro, DO, is a 1988 graduate of the University of New England College of Osteopathic Medicine (UNECOM), and is board certified in Osteopathic Manipulative Medicine (OMM) and Family Practice. She is Department Chair and Associate Professor of OMM at UNECOM, and Director of Medical Education at the UNECOM +1 residency program. Dr. Carreiro specializes in OMM, pain management, pediatric musculoskeletal and sports medicine, and otitis media. She is involved in research on osteopathic manipulation in otitis media, as well as innervation patterns in the pelvis and sacral areas.

Julie Fendall, DO, MOstSc(Paeds), graduated from the British School of Osteopathy in London, and has been in practice for 30 years. She is currently in private practice in Sydney, Australia, with a largely pediatric patient base. She is also a breastfeeding counselor, and treats many infants for feeding and digestive issues. A longstanding faculty member of the Sutherland Cranial Teaching Foundation, she has lectured extensively in Osteopathy in the Cranial Field in the U.K., New Zealand and Australia.

Sue Turner, DO, MA (Hons), MSCC, has been in practice in London since graduating from the European School of Osteopathy in 1979, where she taught from 1979 until 2000, establishing the cranial and pediatric Osteopathy programs, and founding and directing the undergraduate children's clinic. She was also part of the founding team of the Osteopathic Centre for Children in London (1990- 1994).

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A logical approach to complicated sacral and innominate dysfunction

G. Bradley Klock, DO, FAAO

Abstract

The osteopathic profession has long emphasized helping patients with low back pain. The cost to each patient with a chronic problem is great, and the cumulative cost to society is enormous. We feel that much of this cost is due to somatic dysfunction.

Somatic dysfunction is complicated, as there is often a degree of soft tissue strain and articular abnormality present. There is a complicated neurologic response to both, and each component of the dysfunction tends to maintain it. Thus, it makes sense that, to effectively treat somatic dysfunction, we should employ techniques designed to address each component separately, and do so in a logical sequence. Once strain has been addressed, articular components of the dysfunction should be accurately diagnosed and treated using any of the number of techniques designed to do so.

It is true that muscle moves bone, and that muscles and ligaments are responsible for the normal position of bone. Fix the strain, stretch the soft tissues and then reposition the bone. Otherwise, one is stretching tissues shortened in response to a stretch injury, or repositioning bone only to have the strained muscles and ligaments recreate the dysfunction.

Many patients with acute problems, and most with chronic problems, have complicated issues; therefore, diagnosis may also be complicated. Patients compensate for, and live with, a certain degree of somatic dysfunction. Invariably, once the accumulation of individual dysfunctions reaches a certain individually unique threshold, pain and disability ensue.

We should realize that our diagnosis must evolve as the somatic dysfunction does. Layers of dysfunction are often present, and once one problem has been addressed, another dysfunction will emerge and must be corrected.

In more than twenty years of experience, I have discovered that certain combinations of tender points increase the index of suspicion that a complex problem exists. Identifying and treating these points sequentially facilitates complete resolution of each distinct dysfunction in a layer-by-layer fashion, and ultimately resolves each complex problem. Always remain alert to the emergence of new tender points along the way, as they are evidence of another layer to be diagnosed and treated.

Discussion

When we find innominate or sacral dysfunction that is unresponsive to a particular treatment approach, we must ask ourselves one basic question: Why does this pathologic/non-physiologic pattern persist in spite of my efforts? The answer may remain hidden in some aspect of missed or undiagnosed dysfunction. One possibility worthy of consideration is that complex, fascial strain patterns are fairly common, and can hold the innominates and sacrum captive, despite our best efforts, when we fail to recognize them.

Let us define a strain pattern as a distortion of the body's fascial network that can be identified and characterized by a predictable set of tender points, which corresponds to a certain injury or postural preference. This distortion follows a three-dimensional pathway through the body, and will generate abnormal tensions within the patient's connective tissue structures (fascia, muscles, tendons, ligaments) and bone.

Lawrence Jones, DO, originally presented the strain/counterstrain concept as a methodology of both diagnosis and treatment. He encouraged his students to identify new points and develop positions to relieve them. He also encouraged them to modify or customize the positioning he used to relieve the tender points he identified in order to make the technique applicable to the clinical setting at hand. I believe he would have, in the same spirit, endorsed the concept of using the regional distribution of tender points to identify strain patterns, in addition to the more traditional practice of identifying the presence of strain in an individual muscle, tendon or ligament.

Jones would likely not only have recognized the potential for using tender points to identify and treat strain patterns, but also would have seen the efficiency of using tender points to identify the entry point to the treatment of these patterns. The added value in doing so improves outcomes dramatically. Over twenty-plus years of clinical practice, I have found this certainly to be the case.

Let us define an entry point tender point as one that will easily cease being tender by 100 percent when positioned to a point of ease, and, once treated, will then allow other tender points associated with the strain pattern to either resolve spontaneously or to be treated successfully. This entry point must be identified and treated in order to successfully treat the other points in the strain pattern. Each successive point is a new entry point and must therefore easily resolve 100 percent with positioning. If 100 percent resolution does not occur, then the search for the next entry point continues. This methodology allows for a logical and effective sequencing to treat tender points, and therefore a satisfactory and complete resolution of strain patterns.

I view strain/counterstrain as "indirect myofascial release for dummies," so to speak. Even in the hands of a novice, the process is fail-safe. One can identify a strain by finding a tender point, and then relieve the strain by positioning the tissues for an effective release. By definition, strain/counterstrain's treatment effect is accomplished by finding a position where the tender point is 75 to 100 percent improved and holding the position for 90 seconds, whereby the release has taken place. The physician can ensure that the strain does not return by passively positioning the body part back to a neutral position. Final confirmation that the strain has been successfully resolved is gained by checking to see that the point is no longer tender.

This process is equally efficient in identifying and treating the larger phenomenon of strain patterns. In the hands of a modestly skilled practitioner, complex strain patterns can be mapped out and treated effectively. The process can be tracked from one treatment to the next by comparing the "maps" each time you see the patient as objective evidence that treatment is yielding results.

With respect to the innominates, consider that most people are not mechanically neutral when they sustain an injury. It would therefore seem reasonable, even logical, that the innominates might exhibit multiple dysfunctions simultaneously. Fascial strain patterns can be found in a variety of layered forms. Examples include such things as an out-flaring with posterior rotation or an in-flaring with anterior rotation. Even more interesting is the combination of an in-flaring with anterior rotation and a superior shear/up-slip of the innominate. These dysfunctions might involve the pairing of strains involving two or more planes of motion that are simply additive or layered in nature.

Fascial strain patterns can also be found in a variety of antagonistic forms. Perhaps a strain might involve antagonistic innominate motion in much the same manner of strain appreciated in whiplash injuries to the cervical spine, where there is a strain of the anterior and posterior soft tissues. These innominate patterns could involve both anterior and posterior rotation, in-flaring and out-flaring, or superior and inferior shearing (up-slips/down-slips) of the same innominate or both innominates. It may follow, then, that the same possibilities exist with respect to the sacrum. An individual may very well have a chronic backward sacral torsion at the moment when a new injury imposes a unilateral sacral flexion.

These layered and antagonistic patterns are not discussed in the typical undergraduate OMM curricula, and are rarely spoken of in more advanced training programs. I would describe these phenomena as complex strain patterns.

In the years I have practiced osteopathic manual medicine, it has become clear that Jones' strain/counterstrain tender points can serve to raise the index of suspicion that a complex strain pattern is present. There is a close correlation between certain somatic dysfunctions and specific tender points. This is true of the innominates and sacrum, as well as all vertebral segments. Sacral dysfunctions that represent injury patterns, such as typically painful backward torsions or unilateral flexions, exert strain upon and demand a response or compensation by L5. There are typical combinations of tender points present in these instances. These points serve to confirm one's diagnosis and, if the combinations are atypical, they generally indicate that a complicated strain pattern is present.

The sacral tender points discovered by Ramirez, et al.,[1] have proven invaluable to me in suggesting that a complex strain pattern is present. Sacral point two indicates that the sacral base has been strained and has assumed a posterior position. It is typically found when a backward sacral torsion is present. The sacral base moving posteriorly causes strain upon the fifth lumbar, which causes it to compensate with flexion. It follows that there will typically be an L5 anterior tender point. Likewise, sacral point four indicates that the sacral base has been strained and has assumed an anterior position. This anterior position strains the fifth lumbar, causing it to compensate with extension and generate an L5 spinous process tender point.

These observations allow one to predict when all is not so typical. If sacral point two and sacral point four are present, in combination with an L5 anterior, the sacrum may have been subject to strain in both a posterior and anterior direction. In such cases, I have found it very effective to treat the lower extremities first, balance the innominates and treat the tender points (L5 first, then the sacral points) before attempting to diagnose the sacral pattern.

The sacral points are best treated by modifying the suggested approach. Patients with central canal stenosis, foraminal stenosis, spondylolisthesis or herniated and degenerative disc pathology will experience an increase in low back and/or radicular symptoms if these points are treated as described by Ramirez, et al. Employing a gentle, indirect fascial drag to produce a softening of the tender point has proven very effective.

Sacral point two is treated by contacting the soft tissues just distal to the coccyx with the area between the thenar/hypothenar eminences. One should apply a crescendoing, midline anterior/inferior fascial drag until softening is noted. Sacral point four responds to a gentle, midline fascial drag applied by the middle and index fingers to the space between L5 and the sacrum, and directed cephalad. In cases where both sacral point two and four are present, use the sacral fascial drag to determine which point to treat first. If the fascia resists cephalad motion, treat sacral point two. Likewise, if there is resistance to caudal motion, it is most effective to treat sacral point four first. L5 anterior and L5 spinous process tender points should be treated before attempting to resolve either of these sacral tender points.

I have also modified my approach to treating sacral point one. Interest in these points was sparked by lectures presented by Frank H. Willard, PhD, and Andry Vlemming, PhD, at the 2010 AAO Convocation (March 2010, Broadmoor Hotel, Colorado Springs, CO). It has become apparent that these points might, in fact, represent a strain pattern imposed by a contracted biceps femoris (specifically, the long head). These points suggest a strain in the lumbo-pelvic fascia generated by abnormal tension placed on the sacrotuberous ligament by a tight biceps femoris. Sacral point one indicates a strain involving the soft tissues extending from the involved sacrotuberous ligament to the opposite upper thoracic area and shoulder. As such, the patient will typically exhibit tender points corresponding with the biceps femoris (often the semitendinosus) and quadratus lumborum, ipsilateral to sacral point one and tightness of the contra lateral latissimus dorsi and lower trapezius muscles.

I have always been hesitant to apply oblique forces to the sacral base or promontory, and have been resistant to treating sacral point one as described in the literature. These points can be safely treated by inducing extension and rotation of the thorax away from the involved side by placing a pillow under the opposite shoulder and then tilting the table 10 degrees to extend the lumbosacral junction. The ipsilateral leg is then lifted five to ten degrees from the table surface and abducted until softening is noted. Sacral point should not be treated until the strained biceps femoris (semitendinosus) has been addressed.

Once the compensatory strain of L5 has been treated and likewise, the primary/secondary strains of the sacrum have been resolved, we can now logically diagnose and treat the articular component of the sacrum and L5. Check the sacral sulci, the inferior lateral angles of the sacrum, and evaluate motion of the sacral base to confirm the sacral diagnosis. It is now logical to employ muscle energy, since we are stretching muscles and other soft tissues that are no longer strained. Within the course of one to several treatments, most previously persistent patterns will resolve.

Once the strain is resolved and the articular abnormality is corrected, one can then strengthen the core musculature to maintain normal functionality. Do not attempt to stretch soft tissues or rehabilitate them through exercise without first addressing *and* resolving strain. A resolved strain pattern will show no recurrent tender points during follow-up treatments.

The concept is the same within the pelvis. Beginning the evaluation with a standing flexion test and defining a gross positive to be a testament to dysfunction within at least two dimensions (anterior or posterior rotational strain, coupled with an in-flaring or out-flaring strain; posterior or anterior rotational strain, coupled with an up-slip or down-slip; or any other combination of possibilities), we can use the presence of key tender points to help unravel the diagnostic conundrum.

Visual evaluation of the patient in the supine position, in conjunction with a positive standing flexion test, proves to be a powerful aid in the diagnosis of complex innominate strain patterns. Compare how the patient lies on the table to the physiologic neutral. Deviations from neutral are associated with specific strains. There are specific tender points typically present with each one. We should begin by looking at the positioning of the knee on the side of the positive standing flexion test. Perhaps it is elevated from the table (somewhat flexed) indicating hamstring strain, or positioned laterally compared to the other, indicating an out-flaring. Alternatively, the knee may be positioned vertically or more perpendicular to the table (with the toes pointing to the ceiling), indicating an in-flaring.

Gross anterior innominate rotation is associated with an L5 upper-pole tender point. Likewise, gross posterior innominate rotation is associated with an obturator internus tender point. In-flaring correlates with a mid-pole sacroiliac and inguinal tender point and out-flaring with a low ilium tender point.

Tender points in various combinations indicate complex patterns. These patterns must be treated in the correct sequence. Being able to "turn off" a point completely, as mentioned previously, means that point should be treated first, and represents an appropriate *entry point* to the strain pattern. Likewise, the second point in the correct sequence is the next one you are able to suspend. This method of sequencing can, and should be applied to your general approach to all strain patterns of the body. These tender points help one diagnose more completely and resolve more permanently our patients' dysfunctions, especially those that have been resistant to application of HVLA and/or muscle energy techniques.

Failing to achieve lasting resolution of dysfunctions should prompt us to consider these notions. One must apply a stringent and honest appraisal of one's work when he/she evaluates and reevaluates his/her patients. For example, if a sacral pattern or innominate dysfunction has not returned to physiologic neutral after adequate application of muscle energy, let us examine why. Perhaps it is the unresolved muscular and ligamentous strain that holds the bones hostage this day.

I have developed a treatment algorithm to facilitate the use of the concepts discussed in this paper. Many of the tender points I utilize represent ones that I have discovered, while others are those previously addressed by Dr. Jones. I have modified treatment positions for many of the known points, as doing so either allows me to have the patient change positions less frequently or the position simply is more effective in my judgment. Keep in mind that this represents a suggestion as to how one might start employing these principles. Do tailor your approach based on the clinical scenario presented. Be creative and ever mindful that each patient, dysfunction, strain pattern and therefore, each treatment, will be unique.

Pelvis/Sacrum Treatment Algorithm

- Perform the standing flexion test to establish the presence of iliosacral dysfunction and the side of involvement:
    a. Take care to ensure that the patient only flexes forward as far as possible without bending the knees.
    b. Perform two or three times to see how flexing forward and stretching the hamstrings a couple times affects the test results. (Determine the extent of lower extremity issues on iliosacral motion.)
- Perform the seated flexion test to establish the presence of significant sacroiliac dysfunction (significant sacral dysfunction):
    a. Feet may or may not touch the floor (there is benefit to having the thumbs near to/at eye level).
    b. Perform the test with your thumbs on the posterior ledge of the sacral base so you are evaluating the ability of the sacrum to rise out of the pelvis with flexion of the long lever of the lumbar spine.
- View the patient in the supine position to pick up on positional/fascial cues as to which lumbar, innominate and lower extremity tender points will be present.
- Treat the hamstrings/ankle dorsi-flexors and plantar-flexors:
    a. Mid-muscle tender point (semimembranosus)
    b. Pes anserinus tender point (semitendinosus)
    c. Biceps femoris tender point
    d. Soleus tender point
    e. Gastrocnemius tender point
    f. Anterior tibial tender point
- Treat the pubic symphysis with the isolytic technique to relieve tension in the symphysis and facilitate the treatment of tender points associated with innominate dysfunction.
- Identify and treat the innominate in-flare/out-flare tender points:
    a. MPSI (in-flare)
    b. Inguinal (in-flare)
    c. Low ilium (out-flare)
- Identify and treat the innominate rotational tender points:
    a. Obturator internus (posterior rotation)
    b. L5 upper pole (anterior rotation)
- Treat innominate rotation with muscle energy technique.
- Repeat the standing flexion test (if positive, evaluate landmarks for up-slip/down-slip and treat).
- Treat L5 anterior/spinous process tender points.
- Treat the sacral tender points (S2, S4 and S1).
- Diagnose and treat the sacral articular pattern
- Recheck the standing and seated flexion tests.

Acknowledgements

The author would like to acknowledge former DMUCOM Undergraduate OMM Fellows Kurt Holt, DO, and Richard Rapp, DO, for their assistance in treatment demonstrations, manuscript development and editorial preparation. He would also like to acknowledge the many mentors, colleagues, fellows, osteopathic medical students and patients who have influenced his approach to osteopathic care and the development of the treatment protocols described herein.

Standing flexion test

Landmarks: PSISs (red)

Figure 1

Have the patient stand with his/her back to you with the heels roughly four inches apart.

Place your thumbs on the PSISs (Figure 1).

Have the patient lock the knees.

Have the patient flex at the waist (Figure 2).

Figure 2

Take care to ensure the patient only flexes forward as far as possible without bending the knees.

Perform two or three times to see how flexing forward and stretching the hamstrings a couple times affects the test results. (Determine the extent of lower extremity issues influence on iliosacral motion.)

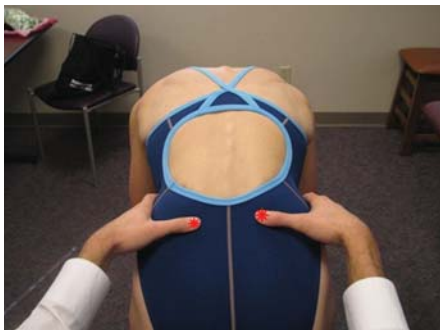

Figure 3

Both thumbs (the PSIS landmarks) should rise equally. The right side rising more than the left indicates iliosacral dysfunction on the right (Figure 3).

Something is wrong with the motion of the innominate relative to the sacrum that involves at least two planes of motion.

Seated flexion test

Landmarks: PSISs (red)

Figure 4

With patient in seated position, place your thumbs on the PSISs (Figure 4).

Figure 5

Move the thumbs medially onto the posterior ledge of the sacral base (Figure 5).

Feet may or may not touch the floor (there is benefit to having the thumbs near to/at eye level).

Have the patient flex at the waist.

The seated flexion test is positive because the right thumb rises higher than the left (Figure 6).

Figure 6

Sacral dysfunction is present.

With the thumbs on the sacral base, you are evaluating the ability of the sacrum to rise out of the pelvis with flexion of the long lever of the lumbar spine. This is a true test of sacroilial motion (motion of the sacrum with respect to the innominates).

Supine visual inspection

Figure 7

The right innominate (leg) seems somewhat in-flared compared to the left (remember the standing flexion test was positive on the right).

The left lower rib cage is anterior.

The head is rotated to the right.
(Figure 7).

Figure 8

The left knee appears flexed compared to the right.

The left side of the pelvis seems closer to the table than the right.
(Figure 8).

Figure 9

The right thigh is flexed compared to the left.
The right foot appears plantar-flexed and the left appears dorsi-flexed.

The right shoulder is anterior, the left is posterior and the upper chest is rotated right (Figure 9).

Articulate the pubic symphysis with an Isolytic technique

Isometric knee abduction:

Figure 10

This technique is effective in correcting most dysfunctions of the pubic symphysis, and provides adequate mechanical and fascial slack to allow positioning for treatment of tender points associated with innominate dysfunction.

Flex the patient's knees and place the feet on the table (Figure 10).

Ask the patient to separate the knees against your equal resistance (10-15 lbs. of force).

Isolytic leg adduction:

Figure 11

Ask the patient to separate the knees (ten inches or so) and hold them in position (Figure 11).

Ask the patient to bring the knees together against your equal resistance (10-15 Lbs.).

Supply a short amplitude isolytic force separating the knees in order to rebalance the pubic symphyseal articulation.

Tender points associated with innominate in-flaring

Mid-pole sacroiliac (MPSI):

Tender point:

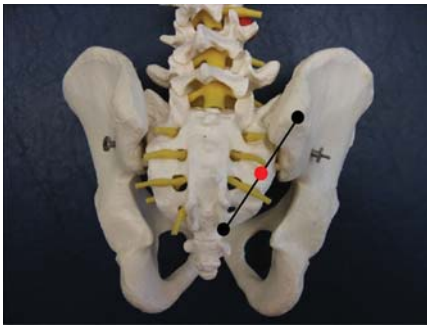

Figure 12

The MPSI tender point (red) is found midway along a line drawn between the PSIS and the inferior lateral angle of the sacrum (ILA) along the sacroiliac joint (Figure 12).

MPSI tender point:

Landmarks (Figure 13):

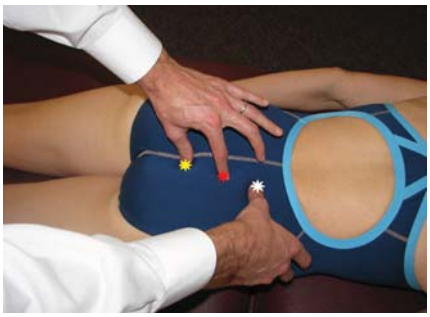

Figure 13

PSIS (white)

ILA (yellow)

Tender point:

MPSI tender point (red)

MPSI tender point treatment:

Figure 14

Flex the knee and thigh to 90°.

Internally rotate the femur 10°.

(Figure 14) Apply gentle upward traction (red arrow) to the femur with the hand in the popliteal fossa.

Inguinal tender point:

Tender point:

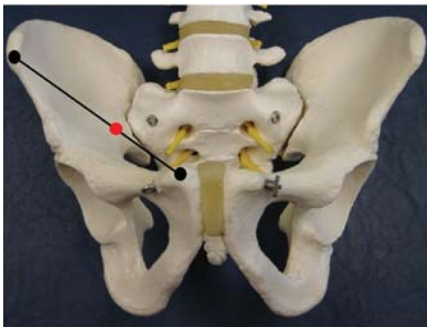

Figure 15

The tender point (red) is found along the inguinal ligament, about one-third the distance from the pubic tubercle to the ASIS (Figure 15).

Inguinal tender point:

Landmarks (Figure 16):

Figure 16

ASIS (white)

Pubic tubercle (yellow)

Tender point:

Inguinal tender point (red)

Inguinal tender point treatment:

Figure 17

Stand on the side of the patient opposite the tender point. Place the patient's legs on your thigh with the knees and thighs flexed to about 90°.

continued on next page

The leg on the involved side is positioned beneath the other, and the opposite ankle is crossed over and placed onto the mid-tibial area. Externally rotate the right femur by applying torque to the right tibia with the left elbow.

Maintain separation of the knees and horizontally adduct the legs about 20° across the body midline to a position of ease. Apply gentle compression along the axis of the right femur toward the acetabulum (Figure 17).

Tender point associated with innominate out-flaring

Low ilium tender point:

Tender point:

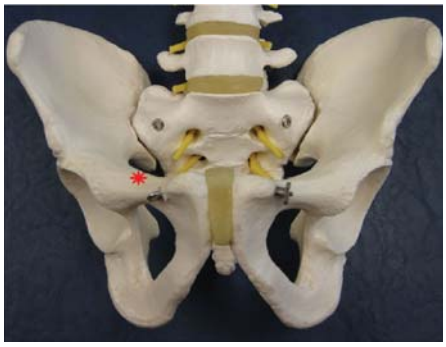

Figure 18

The tender point (red) is located on the extreme lateral portion of the pubic bone (Figure 18).

Low ilium tender point:

Landmarks (Figure 19):

Figure 19

Left ASIS (white)

Pubic tubercle (yellow)

Tender point:

Low ilium tender point (red)

Low ilium tender point treatment:

Figure 20

Flex the hip to 90°.

Externally rotate the femur to the elastic barrier and abduct (about 20°) to a point of ease.

Add compression along the axis of the femur directly toward the acetabulum (Figure 20).

Tender point associated with posterior innominate rotation

Obturator internus tender point:

Tender point:

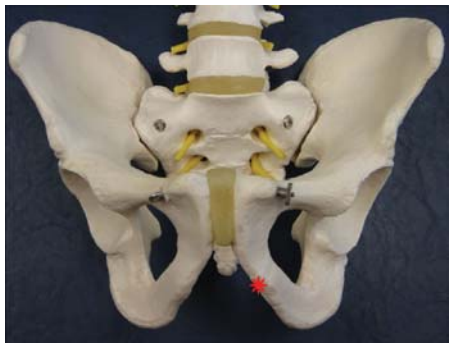

Figure 21

The obturator internus tender point (red) is located on the ramus of the ischium, medial and superior to the ischial tuberosity (Figure 21).

Obturator internus tender point:

Landmarks (Figure 22):

Figure 22

Left ischial tuberosity (yellow)

Tender point:

Obturator internus tender point (red)

Obturator internus tender point treatment:

Figure 23

Stand on the side of the dysfunction and flex the thigh to about 110°.

Externally rotate the femur until softening is noted (about 10°).

The leg may be braced between your arm and the lower thorax.

Add compression along the axis of the femur directly toward the acetabulum (Figure 23).

Tender point associated with anterior innominate rotation

L5 upper pole tender point:

Tender point:

Figure 24

The L5 upper pole tender point (red) is located on the superior and medial aspect of the PSIS (Figure 24

L5 upper pole tender point:

Landmark (Figure 25):

Figure 25

PSIS (yellow)

Tender point:

L5 upper pole tender point (red)

L5 upper pole tender point treatment:

Figure 26

Stand on the side of the tender point.

Place the patient's thigh on your knee.

Grasp the leg below the knee and induce external rotation, allowing the leg to slightly roll down your thigh.

Push down gently on the lower leg to flex the pelvis to a point of ease (Figure 26).

Pertinent lower extremity muscles/tender points

Semimembranosus (mid-muscle) tender point:

Tender point:

Figure 27

The mid-muscle tender point (red) appears along the mid-to-distal thigh along the posterior aspect (Figure 27).

Note: When present, treat this tender point before attempting to treat the semitendinosus point.

Semimembranosus (mid-muscle) tender point treatment:

Figure 28

Flex the hip to 90° and knee to just beyond 90°.

continued on next page

Externally rotate and abduct the femur.

Externally rotate the tibia, invert and plantar flex the foot.

Contact the knee with your innominate crest, and add compression along the axis of the femur directly toward the acetabulum (Figure 28).

Semitendinosus (pes anserinus) tender point:

Tender point:

Figure 29

The pes anserinus tender point (red) is located at the point of insertion of the semitendinosus and is easily identified once the landmark is found (Figure 29).

Pes anserinus tender point treatment:

Figure 30

Flex the hip to 90°.

Externally rotate the femur and flex the knee well beyond 90° (the calcaneus is approximated to the gluteus).

Externally rotate the tibia, invert and plantar flex the foot.

Contact the knee with your innominate crest, and add compression along the axis of the femur directly toward the acetabulum (Figure 30).

Biceps femoris tender point:

Tender point:

Figure 31

The biceps femoris tender point (red) is located along the long head of the biceps femoris muscle approximately one-third to one-half way between the origin and insertion (Figure 31).

Biceps femoris tender point treatment:

Figure 32

Use a pillow to slightly extend the thigh and flex the knee between 70° to 120° (Figure 32, 33, 34). *See text below regarding quadriceps tightness and tenderness during positioning for biceps femoris treatment.*

Externally rotate the tibia.

Induce slight internal rotation of the femur to a point of ease. Maintain the position until a release is noted.

Biceps femoris tender point treatment:

Figure 33

The degree of knee flexion required to reach a point of ease for the biceps femoris seems to depend on the amount of tension in the quadriceps muscles.

Biceps femoris tender point treatment:

Figure 34

If the positioning causes pain in the quadriceps muscles, or if you are unable to find a point of ease, treat the quadriceps muscles and then try once again to treat the biceps femoris point.

Gastrocnemius tender point:

Tender point:

Figure 35

The gastrocnemius tender point (red) is in the medial aspect of medial belly of proximal gastrocnemius muscle (Figure 35).

Gastrocnemius tender point treatment:

Figure 36

Flex the knee and hip to 90°.
Plantar flex the ankle/foot and invert the foot.
Translate the tibia (move in the horizontal plane) until softening is noted (Figure 36).

Soleus tender point:

Tender point:

Figure 37

The soleus tender point (red) appears in the midline at about the mid-calf region (Figure 37).

Soleus tender point treatment:

Figure 38

Flex the knee and hip to 90°.

Plantar flex the ankle/foot.

Keep the foot in the midline (no inversion/eversion).

Translate the tibia (move in the horizontal plane) until softening is noted (Figure 38).

Anterior tibial tender point:

Tender point:

Figure 39

The anterior tibial tender point (red) appears along the lateral edge of the middle-third of the tibia (Figure 39).

Note: An increased tension/restriction in dorsi-flexion was noticed while treating tender points associated with plantar flexion of the ankle. Therefore, the antagonist anterior tibial muscle group was evaluated for tender points.

Anterior tibial tender point treatment:

Figure 40

Using the foot as a lever, induce dorsi-flexion and foot eversion/inversion until softening is noted (Figure 40).

Tender points associated with L5 flexion dysfunctions

L5 anterior tender point (L5 A):

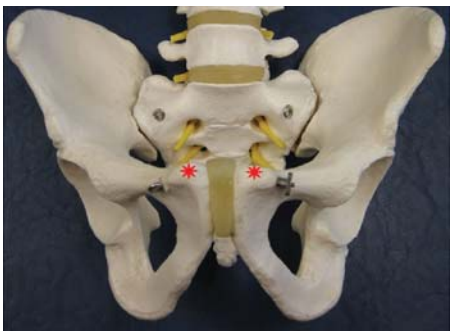

Figure 41

Tender point:
The L5 A tender point (red) is found on the pubic tubercle just to the left and/or right of center (Figure 41).

L5 A (right) tender point:

(Figure 42) Landmark:

Figure 42

ASIS (yellow)

Tender point:
The L5 A tender point (red).

The patient will typically have one or both if L5 is flexed.

These tender point(s) will be present if the patient has a backward sacral torsion.

L5 A (right) tender point treatment:

Figure 43

The feet are essentially midline (ankle on side of dysfunction is beneath the other ankle).

Induce bilateral femoral external rotation.

Side-bend the lumbar spine away (feet still midline) and rotate pelvis toward the point.

Apply compression along the axis of the femur directly toward the acetabulum (Figure 43).

Tender points associated with L5 extension dysfunctions

L5 spinous process (SP) tender point:

Figure 44

Tender point:
The L5 SP tender point (red) is found on the tip of the spinous process just to the left and/or right of the midline (Figure 44).

L5 SP (right) tender point:

(Figure 45) Tender point:

Figure 45

L5 SP tender point (red)

continued on next page

Typically the patient will have one or both if L5 is extended.

These tender point(s) will be present if the patient has a unilateral sacral flexion.

L5 SP (right) tender point treatment:

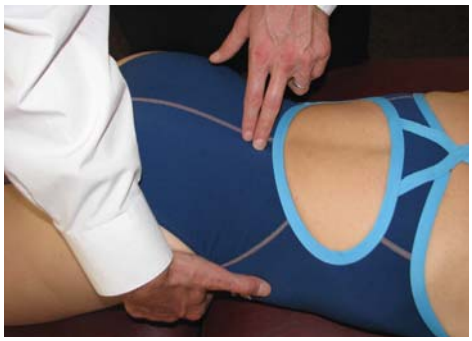

Figure 46

The head of the table is raised (roughly 10 °) until softening is felt under your finger.

The right ASIS is lifted straight up or pulled toward you to a point of ease (Figure 46).

Contact the table edge with your thigh on the same side as the monitoring finger.

This will generally protect you from straining your low back.

Tender points associated with sacral dysfunction

Sacral tender points 1, 2 and 4 (S1, S2 and S4):

(Figure 47) Landmark:

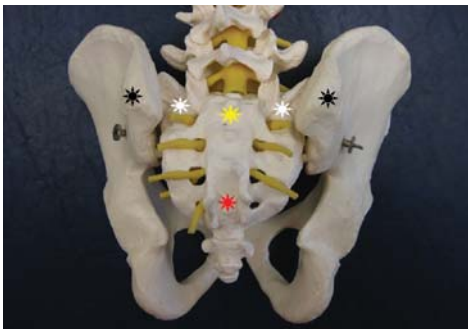

Figure 47

PSIS (black)

Tender points:

S1 (white)

S2 (yellow)

S4 (red)

Evaluate sacral fascial drag:

Figure 48

Evaluate fascial drag (slack) in the sacral area (Figure 48).

If the fascia gives more freely in a cephalad direction, the drag is cephalad; likewise if it gives more freely in a caudad direction, the drag is caudad.

Caudad drag suggests an S2 point may be present; cephalad drag suggests an S4 may be present.

S1 tender point:

(Figure 49) Landmark:

Figure 49

The PSIS (black)

Tender point:

The S1 tender point is just medial to the PSIS in the sacral sulcus.

S1 (left) tender point treatment:

Figure 50

Place a pillow beneath the opposite shoulder to cause rotation of the torso away from the point, and tilt the table (10°) to cause slight extension at the lumbosacral junction.

Extend and abduct the thigh until softening is noted (Figure 50).

S2 tender point:

(Figure 51) Landmark:

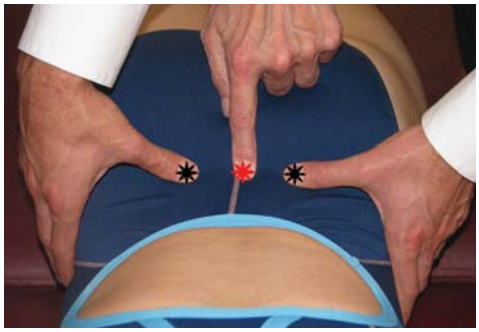

Figure 51

PSIS (black)

Tender point:

The S2 tender point (red) is just inferior to the PSISs on the spine of the sacrum.

An S2 tender point, in conjunction with an anterior L5, is generally associated with a backward sacral torsion.

S2 tender point treatment:

Figure 52

Contact the midline of the perineum just distal to the coccyx with the area between the thenar and hypothenar eminences.

Apply a gentle fascial drag anteriorly and inferiorly until softening is noted (Figure 52).

The light compressive force (soft tissue stretch) is directed inferiorly and anteriorly.

You should take care to direct the force midline and not to veer left or right of center.

S2 tender point treatment:

Figure 53

The physicians' other hand may be placed in the region of T4 to apply a slight distractive force anteriorly and superiorly (Figure 53).

Lateralize the force according to palpation of direction of greatest tissue slack.

Note: T4 is often found in flexion, usually with an anterior thoracic tender point.

S4 tender point:

(Figure 54) Landmark:

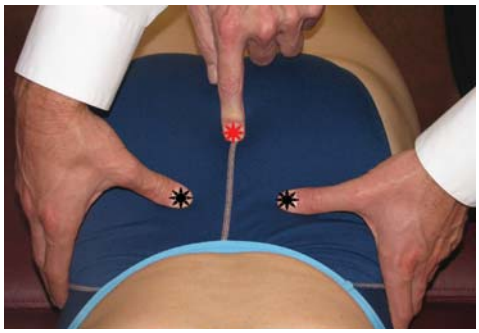

Figure 54

PSIS (black)

Tender point:

The S4 tender point is located in the midline on the spine of the sacrum slightly superior to the sacro-coccygeal junction.

Note: An S4 tender point in conjunction with an L5 tender point is generally associated with a unilateral sacral flexion.

The exception to this common association occurs when the unilateral sacral flexion is secondary to an up-slipping of an innominate, in which case there will be no S4 point.

S4 tender point treatment:

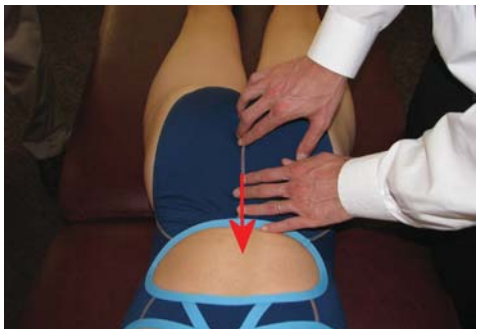

Figure 55

Contact is made at the lumbosacral junction with the index finger.

Apply a downward pressure anteriorly with a small, but sufficient, force to ensure that you can then generate a gentle fascial drag in a cephalad direction (Figure 55).

The force should always be directed in the midline.

Balance the articular rotational component of innominate dysfunction

Muscle energy treatment (anterior innominate rotation):

Figure 56

With one hand behind the knee, induce slight flexion and place the other hand onto the innominate (thenar eminence just beneath the ASIS)

The patent will lower the knee back toward the table against your resistance while you apply a moderate posterior/superior pressure onto the ASIS (Figure 56). Repeat once or twice.

Muscle energy treatment (posterior innominate rotation):

Figure 57

Have the patient slide to the edge of the table.

Abduct the hip slightly and drop the leg off the table.

Place one hand on the involved leg, just above the patella and brace the other hand on the opposite ASIS to stabilize the pelvis.

Ask the patient to raise the leg on the side of the dysfunction toward the ceiling (Figure 57). Repeat once or twice.

References

1. Ramirez MA, Haman J, Worth L. Low Back Pain: Diagnosis by Six Newly Discovered Sacral Tender Points and Treatment with Counterstrain. *JAOA*. 1989;89(7):905.

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CME QUIZ

The purpose of the quiz found on page 36 is to provide a convenient means of self-assessment for your reading of the scientific content in "A logical approach to complicated sacral and innominate dysfunction" by G. Bradley Klock, DO, FAAO.

Please answer each question listed. The correct answers will be published in the December 2012 issue of the *The AAO Journal*.

To apply for Category 2-B CME credit, record your answers to the *AAOJ* CME quiz application form answer sheet on page 36. The AAO will note that you submitted the form, and forward your results to the AOA Division of CME for documentation. You must score a 70 percent or higher on the quiz in order to receive CME credit.

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Author(s): G. Bradley Klock, DO, FAAO

Publication: *The AAO Journal*, Volume 22, No. 4, December 2012, pp. 21-35.

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September 2012 *AAO Journal* CME quiz answers:

1. **B**
2. **A**
3. D
4. D

Answers to the December 2012 *AAOJ* CME quiz will appear in the March 2013 issue.

Mail this page to:
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1. According to the author, which of the following is true regarding innominate or sacral dysfunctions that are unresponsive to treatment?

A) They are due to a two-dimensional distortion pathway.

B) They are due to Jones CounterStrain points.

C) They are due to strong core muscles.

D) They are due to unrecognized, complex fascial strain patterns.

2. According to the author's Pelvis/Sacrum Treatment Algorithm...

A) Viewing the patient supine is performed immediately after the Seated Flexion Test and before the Standing Flexion Test.

B)Viewing the patient supine is performed immediately after the Seated Flexion Test, which is performed after the Standing Flexion Test.

C) Viewing the patient supine is performed immediately after the Seated Flexion Test, which is performed before the Standing Flexion Test.

D) Viewing the patient supine is performed immediately after the Standing Flexion Test and before the Seated Flexion Test.

3. The author recommends employing the techniques of Ramirez to reduce low back pain associated with spondylothisthesis.

A) True
B) False

4.The following are tender points identifies by the author:

(1) hamstrings
(2) innominates
(3) pubic symphtsis
(4) sacral
(5) spinous process

Which of the following is the correct order of treatment following the author's algorithm?

A) 1, 2, 3, 4
B) 2, 4, 5, 1
C) 3, 2, 5, 4
D) 4, 5, 1, 3

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A research protocol to determine if OMM is effective in decreasing pain in chronic pain patients and decreasing opioid use: Brief report

Jessica B. Smith, DO; Lance C. Ridpath, MS; Karen M. Steele, DO, FAAO

Abstract

Context: Osteopathic Manipulative Medicine (OMM) has been shown to be an effective non-pharmacological treatment of pain. Opiate narcotics are shown to be amongst the most effective pharmacologic methods for pain relief, despite their addictive properties. However, there is lack of research that addresses opioid use, chronic pain and the benefits of OMM concurrently.

Objectives: To develop a protocol to effectively evaluate the benefits of OMM to relieve symptoms of chronic pain enough to allow for the dose of narcotic pain medications to be reduced and/or discontinued entirely.

Methods: This is a randomized, prospective, controlled pilot study, with an intention to treat protocol. Subjects were 21 to 55 years old experiencing pain for at least three months, and were referred by their primary care physician. All patients had four weekly visits the first month, followed by two visits the second month and one the third month. All subjects received osteopathic structural exams at each visit. Patients in the treatment group received OMM at each visit, while patients in the placebo control group did not receive OMM. Patients completed a pain and disability questionnaire (PDQ) at the beginning and completion of the study, and a pain diary and pill counts at each visit.

Results: Three patients were referred, two patients were enrolled and one patient participated. The protocol is reproducible, the forms used are adequate and the data is analyzable. Subject 2's pain level as recorded from the pain diary decreased from 8/10 to 7/10, with resolution of mid-back pain, though low-back pain remained. The subject's pill count remained steady throughout the study, averaging four pills/day.

Conclusions: Our experience supports the feasibility of conducting this study on a larger scale. The protocol is reproducible, and the outcome measures and forms for data collection are effective for evaluation and subsequent data analysis. Subject recruitment, enrollment and retention are difficult. A larger patient population, more referring physicians and an assistant available for same-day enrollment and scheduling are needed to increase the subject pool.

Introduction

At least 50 million people in the United States (US) struggle with chronic pain syndromes, which are characterized by pain lasting a minimum of three months.[1] The pain can be so severe that it progresses to the point of disability. Pain is a combination of biological, psychological and socio-behavioral aspects, and therefore can have a significant impact on a person's quality of life.[2] There are several pharmacologic and non-pharmacologic treatment modalities in place that have been shown to be effective for controlling non-malignant chronic pain.

Opiates, such as morphine, hydromorphone, methadone, meperidine, oxycodone and many more,[3-4] are considered the gold standard in the pharmacologic treatment of chronic pain conditions. From 1997 to 2002, the medical use of commonly prescribed opioids markedly increased: morphine by 73 percent; hydromorphone by 96 percent; fentanyl by 226 percent and oxycodone by 403 percent.[5] Although opiates are highly effective at decreasing pain, they also are known to cause sedation, constipation, nausea, itching, and respiratory depression, and are associated with euphoria.[2] In addition to these common side effects, patients taking long-term opiates build a physical tolerance to their effects. The euphoria and physical dependence associated with opiates are troubling because of the increased risk for abuse and subsequent addiction. Beginning in the late 1990s, more than a two-fold increase in lifetime abuse was observed, with an estimated 6 to15 percent of the US population having an addiction to opiate pain medications.[5-6]

OMM is a non-pharmacologic treatment modality that has proven to be effective at controlling and decreasing pain resulting from various triggers.[7-18] OMM helps to eliminate somatic dysfunctions, or any impaired or altered functions of related components of the somatic, skeletal, arthrodial and myofascial structures related to vascular lymphatic and neural elements.[8-9,19] Somatic dysfunctions

can lead to pain sensitization, thus increasing an individual's perception of pain.[8] OMM is considered a form of standard care for osteopathic physicians, and is taught at the osteopathic medical school level, postdoctoral level and for continuing medical educational purposes. Since diagnosis and treatment are done through manual palpation by the physician, OMM can be readily integrated within primary care facilities.[18]

Methods

This is a randomized, prospective, controlled pilot study, with an intention to treat protocol to evaluate the efficacy of OMM in decreasing pain and narcotic use in patients struggling with chronic pain. The protocol was designed to evaluate patients' change in pain and function through a pill count (Form A), pain diary (Figure 2) and pain and disability questionnaire [(PDQ) (Figure 1)]. The treatment group received OMM at each visit, and the placebo control group underwent an osteopathic structural exam, but received no treatment. The institutional review board of the West Virginia School of Osteopathic Medicine (WVSOM) in Lewisburg, WV, approved the study.

Patients

Patients participating in this study were between the ages of 21 and 55, had a current diagnosis of chronic pain and were currently being treating with opiates for that condition. Patients were excluded from the study if they met any of the following criteria: current diagnosis of cancer; primary joint disease (e.g., rheumatoid arthritis, infectious arthritis, etc.); diagnosis of primary or metastatic malignant bone disease; metabolic bone disease (e.g., osteoporosis); genetic disorders (e.g., Down's syndrome); major surgery related to the pain diagnosis within the past three months; receipt of OMM within the last three months; and current illicit drug/recreational drug use.

Referrals and Enrollment

Both osteopathic (DO) and allopathic (MD) physicians at the Robert C. Byrd Clinic (RCBC) in Lewisburg, WV, were recruited to refer any of their patients who were suffering from chronic pain and met the inclusion criteria. Each of the consenting physicians was provided with extensive detail on the purpose of the study, as well as inclusion/exclusion criteria for referral. There were a total of seven referring physicians.

In an attempt to maximize patient enrollment, the principal investigator (PI) was on call during RCBC business hours to enroll patients at the time of physician referral. This was done because it was felt that, if referred, patients were less likely to contact the PI at a later date to participate in the study.

Randomization and Blinding

Enrolled subjects were randomly assigned to the treatment or control group utilizing a modified form of "urn randomization." Sixteen envelopes were labeled "Subject #1," "Subject #2" and so on all the way through "Subject #16." Once shuffled, playing cards were picked face down and used to determine if a patient was to be in the treatment group (N=8) or the control group (N=8). Red cards indicated the treatment group; black cards indicated the control group. The group designation was written on a

Pill Count Form

ID #_____ DOB:_____ Today's date:_____

Name of Prescription (generic):_____

Dose of prescription:_____

(A. Initial Pill Count:_____)

B. Dates of Pill Count Period: ____/____/_____to ____/____/_____ = _____Days Elapsed

C. Number of Pills today:_____

D. Number of pills received since last visit (# of pills in refill):_____

E. Average number of pills taken per day:_____

(Note: If NO refills since last visit then: (A-C)/B= E)

(Note: If Refills since last visit then: ((A+D)-C)/B= E)

Nurse Signature_____ Date_____

Form A

Subject ID#: _____ **Date:** _____

Instructions: These questions ask your views about how your pain now affects how you function in everyday activities. Please answer every question and mark the ONE number on EACH scale that best describes how you feel.

1. Does your pain interfere with your normal work inside and outside the home?
Work normally **Unable to work at all**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

2. Does your pain interfere with personal care (such as washing, dressing, etc.)?
Take care of myself completely **Need help with all my personal care**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

3. Does your pain interfere with your traveling?

Travel anywhere I like **Only travel to see doctors**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

4. Does your pain affect your ability to sit or stand?
No problems **Cannot sit/stand at all**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

5. Does your pain affect your ability to lift overhead, grasp objects, or reach for things?
No problems **Can not do at all**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

6. Does your pain affect your ability to lift objects off the floor, bend, stoop, or squat?
No problems **Can not do at all**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

7. Does your pain affect your ability to walk or run?
No problems **Cannot run/walk at all**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

8. Has your income declined since your pain began?
No decline **Lost all income**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

9. Do you have to take pain medication every day to control your pain?
No medication needed **On pain medication throughout day**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

10. Does your pain force you to see doctors much more than before your pain began?
Never see doctors **See doctors weekly**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

11. Does your pain interfere with your ability to see the people who are important to you as much as you would like?
No Problems **Never see them**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

12. Does your pain interfere with recreational activities and hobbies that are important to you?
No interference **Total interference**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

13. Do you need the help of your family and friends to complete everyday tasks (including both work outside the home and housework) because of your pain?
Never need help **Need help all the time**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

14. Do you now feel more depressed, tense, or anxious than before your pain began?
No depression/tension **Severe depression/tension**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

15. Are there emotional problems caused by your pain that interfere with your family, social and work activities?
No Problems **Severe problems**
0------ 1------ 2------ 3------ 4------ 5------- 6-------- 7-------- 8-------- 9-------- 10------

_____
Nurse

***Figure 1**. Pain and disability questionnaire*

sheet of paper, placed into an envelope, and the envelope was sealed.

The referring physicians were blinded as to which group their patient was assigned. Since the physicians were still providing medical care for the subjects, they were not blinded as to the clinical course of the patient. The PI was blinded to the outcomes and scores of the PDQ (Figure 1), pain diary (Figure 2) and pill count (Form A) until the research study was complete. A nurse was responsible for administering the forms to the patients prior to the patient meeting with the PI. Once the patient completed the forms, the nurse placed them in a secure envelope and delivered them to the statistician for data analysis.

Office Visits and Interventions

The protocol called for all subjects in the research to have four weekly visits in the first month, followed by two visits the second month and one the last month. At the initial visit, eligibility was confirmed and all subjects filled out a PDQ (Figure 1), pill count form (Form A) and pain diary (Figure 2) prior to meeting with the PI. At each visit a problem-focused history was taken, and a physical and osteopathic structural exam were performed by the PI, under the supervision of a certified osteopathic physician.

All patients in both groups continued to receive standard care for pain management by their primary care physician. All participants filled out a pain diary and underwent a pill count prior to meeting with the PI at each visit.

Subjects in the treatment group received OMM at each visit, consisting of myofascial release (MFR), muscle energy (ME), counterstrain (CS), articulatory and balanced membranous tension (BMT) techniques, lasting approximately 20 to 25 minutes and addressing the specific somatic dysfunctions that were found.[19]

The subjects in the placebo control group had the same schedule, receiving a focused history, physical exam and osteopathic structural exam at each visit. Patients in the control group did not receive any OMM.

Outcome Measurements

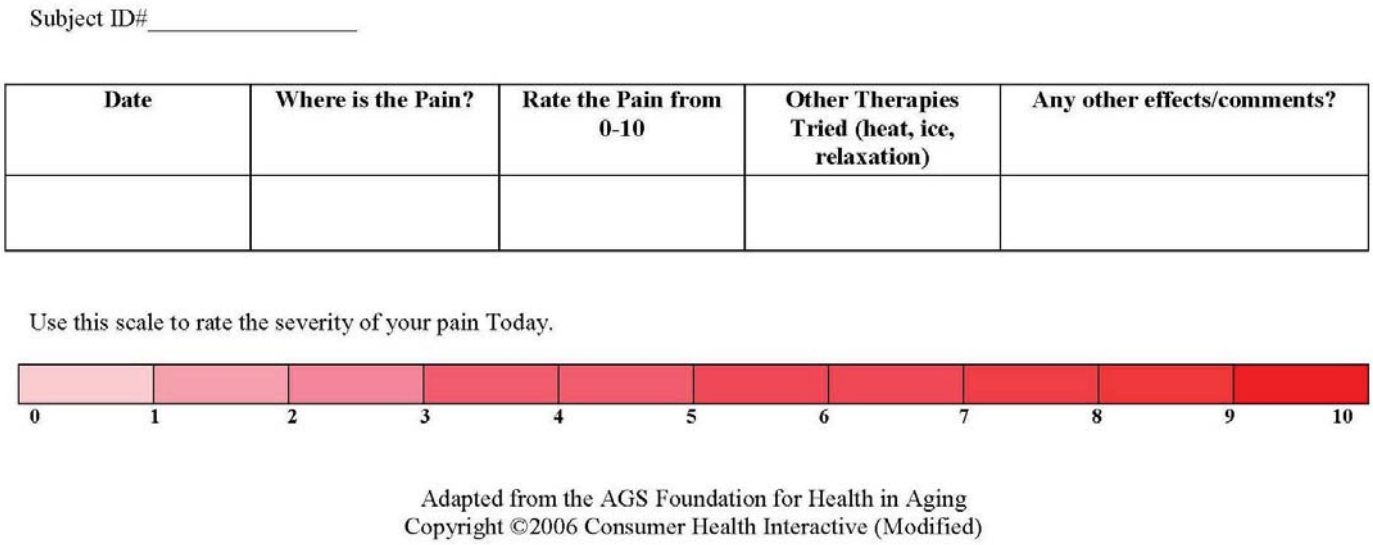
Changes in the subjects'pain level and functioning were documented using the PDQ, pain diary and pill count. A history and physical exam form was used to document the findings from the physical and osteopathic structural exam and history.

Pain and Disability Questionnaire (PDQ)

The PDQ asked subjects specific questions regarding their pain and how it affected their function in everyday activities (Figure 1). This questionnaire aids in the analysis of the physical, mental and emotional effects of the patients' pain and how it affects their lives in- and outside the home. It can also show changes in specific areas of functioning, such as lifting a heavy object. Subjects were to complete the PDQ at their initial visit and their final visit. Any differences in the two scores were to be analyzed statistically for differences between the two study groups.

Pain Diary

Subjects in both groups completed a pain diary at each visit. The pain diary asked the patient to evaluate their current pain on a scale of one to 10, with ten being the



Subject ID#_____

Date	Where is the Pain?	Rate the Pain from 0-10	Other Therapies Tried (heat, ice, relaxation)	Any other effects/comments?

Use this scale to rate the severity of your pain Today.

0 1 2 3 4 5 6 7 8 9 10

Adapted from the AGS Foundation for Health in Aging
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***Figure 2**. Pain diary*

worst pain possible and zero being no pain (Figure 2). In addition to ranking the severity of their pain, patients were asked to record the location of the pain, if anything made the pain better/worse, and if any other therapies helped the pain, such as heat or ice. An average pain ranking throughout the duration of the study could be calculated and compared between groups for any changes.

Pill Count

Pill counts were used to evaluate any changes in opioid use during the research project and to determine if there were significant differences between the treatment and control groups. Patients were asked to bring their pills with them to all visits. A pill count was performed at the patient's first visit to establish a baseline number of pills for the patient. Subsequent pill counts were conducted at each visit thereafter. All of the pill counts were performed by the nurse in the OMM Department at the Robert C. Byrd Clinic, who documented the current number of pills, the number of days between the last visit and any prescription changes or refills between visits. This information was documented on the pill count form, and the average number of pills taken were calculated for that time period. (Form A). The patient's referring physician continued to manage their opioid pain treatment.

History and Physical Exam Form

The data collection form used during each visit to document the history and physical findings included an area to document the patient's chief complaint (a.k.a. diagnosis that required treatment with opioids) and a section for the subjective description of their pain (onset, location, duration, character, aggravating/alleviating factors, radiation, time, severity). Patients were asked any pertinent medical history pertaining to their chief complaint (Form B). This form also allowed for the documentation of the physical and osteopathic structural exam findings.

Statistical Analysis

Statistical analysis will attempt to determine if a decrease in the severity of pain, the rate of improvement in the quality of life and the decrease in medication use for the treatment group is different from that of the control group.

A PDQ was to be analyzed for any changes in lifestyle quality between the beginning and end of study participation. The pain diary was to be analyzed utilizing the chi-squared test, an odds ratio test, and a Spearman rank-correlation to evaluate changes in the severity of pain. The pill count was to be converted to equianalgesic doses and analyzed using Analysis of Variance to determine any differences between the two study groups.

Results

Three patients were referred to participate in this research study, two patients were enrolled and one subject (Subject 2) participated. Subject 2 completed five out of the seven appointments that were indicated for the research protocol. No subject dropouts were the result of any adverse events. Subject 1 had repeated cancellations because he/she was unable to secure transportation, and Subject 2 moved away prior to the completion of the study. The third patient that was initially referred ultimately declined to participate because of potential scheduling conflicts that would result in the inability to follow the required protocol.

Due to the limited subject enrollment, the data that was obtained from this study was not analyzable.

The one subject that participated in the study reported mid- and low-back pain at a level 8/10 on the pain diary at the initial visit. By the fifth visit, the pain was reduced to a level of 7/10 and was only present in the low back (Figure 3). The data gathered from the pill count showed that Subject 2 had an average daily pill usage of four pills/day, which remained steady throughout the course of the study. Since Subject 1 was enrolled but never participated in the study, all of the values for analysis were entered as missing data.

Comments

The results obtained from this study show that the protocol is feasible. The forms are adequate for acquiring the desired data, are easy to understand and have directions that are easy to follow. Subject referral and enrollment were significantly less than anticipated. The initial protocol called for 16 patients—eight patients in the treatment group and eight patients in the control group. One major contributing factor to the low subject enrollment is the small population size in the research area. Although a continuous enrollment period was employed in attempt to increase these numbers, the service area of the RCBC was extremely limiting. We also believe that attempting to complete this study using a clinic made up of predominantly osteopathic physicians (83 percent) and a specialty OMM clinic added further limitations in subject referral and enrollment. The majority of the osteopathic physicians were already utilizing OMM to help with pain control, which excluded patients from this study.

Another challenge we were presented with during this study was appointment scheduling. Of the three subjects that were referred, two of them did not participate because of scheduling conflicts or inability to make it to the appointments.

HISTORY/PHYSICAL COLLECTION FORM

Subject ID#_____ Date:_____

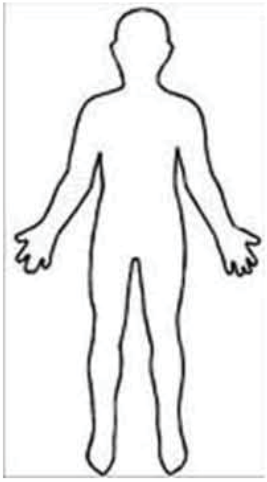
Exclusions

--Cancer Diagnosis	--Pain-related surgery within the last three (3) months
--Primary Joint Disease (eg rheumatoid arthritis)	--Current Illicit Drug use
--Metastatic/Malignant Bone Disease	--Metabolic Bone Disease (Osteoperosis)
--Genetic Disorder (eg. Down's Syndrome)	--OMM within the last three (3) months

Chief Complaint:

Subjective:
O
L
D
C
A/A
R
T
S

Objective: (Somatic Dysfunctions)



Head:

Cervical Spine:

Thoracic Spine:

Upper Extremity:

Lower Extremity:

Lumbar Spine:

Pelvis/Sacrum

Assessment/Plan:

_____
Primary Investigator Signature

Form B

Figure 1. *Pain and disability questionnaire*

One weakness that was discovered in completing this study was the validity of the pill count. Opiates come in several different formulations, causing potential discrepancies between a patient's dose and frequency. Prescriptions are often written for a specific number of pills at specific time intervals or are written to be taken as needed per day for pain up to a maximum specified dose.[4] Patients will often continue to take the same dose at the same frequency despite decreased levels of pain because of how a prescription is written. Therefore, it is difficult to determine the accuracy of the pill count and if it is directly related to a patient's pain.

Future research planning will involve several changes to increase the number of subjects, including: completing the study in an area with a larger population, which will likely increase the subject pool; monthly PDQ forms; and use of an equivalency chart to standardize all patients' opiate medications and account for differences in subject's pain medication dosing/frequency. A demographics form will be created in order to compare the study groups.

Conclusion

We reported on the feasibility of utilizing this randomized, prospective, controlled, intention to treat protocol to evaluate the efficacy of OMM in decreasing pain and the need to use opiate medication for pain control. Subject referral and enrollment were low because of factors related to community population size, inclusion criteria and conducting the study in an area with predominantly osteopathic physicians.

The outcome measures (pain and disability questionnaire, pain diary and pill count) are effective tools for adequate evaluation of the benefits of OMM and produce data that is easily analyzable. The patient randomization and study protocol has the potential to be reproduced in a larger community on a larger scale, and could potentially be utilized at multiple sites to increase the number of patients referred to and enrolled in the study. Since the protocol is dependent on individual subject enrollment, it is not necessary to place limits on the subject recruitment period. The ability to have an indefinite enrollment period would allow for a considerable increase in the number of potential research subjects. The results and data that were obtained from the outcome measures used in this project support the feasibility of performing this study or similar projects on a larger scale. We are publishing this article in the event that other individuals interested in researching the relationship between OMM, chronic pain and opioid use may find this feasibility study helpful in the design of additional studies on this topic.

Acknowledgements

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The stabilometric platform as a measuring instrument

Yannick Huard, DO (Fr), ScM

Introduction

More than two centuries ago, Aristotle already understood that the position of the parts of the body relative to one another is the expression of superior activities, as well as the position of these parts relative to the environment.[1] Among many activities, Newton worked on different studies about mechanics, balance of forces and man's struggle against gravity.[2]

This kind of research has improved, especially as far as measurements are concerned. In many activities, posture and balance are evaluated. For example, the Occidentals are aware of posture at work.[3] In Japan, actors express emotion by using their posture. Moreover, Grini, et al., have shown that the position of some parts of the body change with vocal expression.[4]

In any case, posture always refers to what underlies it. Measurements in posturology concern the superior activities that posture reveals. No postural measurements are possible without a postural concept. That is why, in order to present measurements in posturology, you first have to show exactly what posturologists are measuring.

The beginnings of the postural concept

During the 17th century, Borelli drew the vertical of gravity in the human body.[5] He suggested that the laws of mechanics weren't exclusively reserved for heavenly bodies. From that moment, scientists realized that posture and balance were linked. In the early 19th century, Bell raised the question of postural control[6]—the human body was definitely able to adjust to deviate from the vertical.

Some years later, Von Vierordt noticed that postural control wasn't the effect of one sense, but of a whole series of sensitivo-sensorial data:[7] visual, tactile and proprioceptives ones. Then, Von Vierordt had the intuition that recordings of human posture standing at rest were likely to inform us about the functioning of what would become the postural system. He recorded the very first stabilometric signals.

The postural system[8,9,10]

Control in retroaction

The human body is mechanically unstable, as its center of mass is located above its center of pressure on the ground. As soon as the resultant of the forces of gravity are no longer in line with the forces of reaction from the ground, a torque is created that tends to accelerate the body's fall. Therefore, that unstable body requires a system of control in retroaction whose inputs must be able to detect the slightest deviation from the position of balance in order to command the appropriate reactions for a return to that position of balance as soon as possible.

The inputs of the system: Exo-inputs and endo-inputs

There are three universally accepted exo-inputs in the system of control: the eye, the vestibular apparatus and the foot. Up to now, we don't know of any others. Since they are directly related to the external environment, they can directly pick up the movements of the body relative to this environment. Only sensitivo-sensory organs related to the environment can allow for precise stabilization of a human in his environment.

The eye turns in its socket, whereas the vestibule is stuck in the temporal bone. Thus, the position data given by the eye can't be compared to the position data given by the inner ear if the position of the eye in the socket is foreign to the postural system. That is why, first of all, the oculomotricity gives necessary data to the postural system, even if it does not have any direct connection with the external world. Oculomotricity is an endo-input of the postural system.

The same reasoning is used for the rachis, especially for its two more mobile parts, the cervical and lumbar vertebrae, as well as for the joints of the lower limbs that give the position of the plantar exo-sensor.

The outputs of the system

The appropriate kinematic reactions for stabilization of the human body lead to mobilization, either of the pressure area or the mass area, in order to bring them nearer to the same vertical of gravity. Now those two strategies are very different. The body's mass acts as a low-pass filter, limiting the speed of the shifts of the center of mass (the frequency of the "human pendulum" is approximately 0.3 Hz). On the contrary, shifts in the center of pressure put in motion considerably less important masses. They can be much quicker, and therefore more efficient and use less energy. Obviously, the functioning of the postural system is not univocal.

The upright postural system

The human body is made of the superposition of modules (legs, trunk, arms, head, etc.). Each module is

linked to the subjacent one, leaning on it thanks to muscles that have their own central and peripheral regulation, and are devoted to maintaining the position of reference of the module. The righting reflexes illustrate that modular organization.[11] When standing at a rest position, that modular organization, such as multiple pendulums, modifies itself in order to transform the body into a single inverted pendulum,[12] which reduces the many links the postural system has to control. Then, the motor reactions appear quickly, involving better stabilization and making the whole system very acute.

The tactics of the inverted pendulum are coherent with the tactics of mobilization of the center of pressure. Together, they resemble the tactics of a broom (held as a pendulum, upside down, balancing on one's finger) acknowledged as the quickest tactics, more efficient and less onerous in terms of energy.[13]

The inputs of the upright postural system are also specified by their object. The semi-circular canals influence dynamic postural control, but not orthostatic postural control—the accelerations of postural sway are then lower than the threshold of perception of those sensors.[14] The gain of the neuromuscular spindles is considerably higher when muscular stretching is approximately as wide as the range of the orthostatic postural sway.[15]

What do we have to measure in medical practice?

From the concept of the postural system, it is possible to draw up an inventory of the measurements that are likely to interest therapists.[16,17]

- The mean position of the vertical of gravity relative to a body referential allows one to appreciate the symmetry of the pressures acting on the joints of the body's axis;
- The standard deviation relative to the mean position allows one to appreciate the efficiency of the system of control that has to stabilize the position of the mass area;
- The energy spent in order to obtain that efficiency;
- Muscular stiffness conditions the modular organization of the body into an inverted pendulum;
- The range of postural sway according to the frequencies controls the effect of biological rhythms, especially ventilation, on body stability;
- The integration of the various afferent information (visual, vestibular and plantar) in postural control is not automatically guaranteed;
- The relative importance of various afferent information in postural control;
- The number, interdependence and/or hierarchy of factors intervening in the nonlinear dynamics of postural control;
- The independence of postural sway guarantees a sub-cortical treatment of information.

The stabilometric platforms

The use of stabilometric platforms has become widespread in research laboratories (except in the U.S., where Nashner's apparatus[18] has been used almost exclusively for many years). The models of platforms vary according to their builders, who use either sensors of forces (pressure gauges or piezo-electric quartz) or sensors of length (electromagnetic plungers) grouped by three or four under the platform, with one platform for each foot or one platform for both feet.

Invention and innovation reached their peak in the 1960s and 1970s. Researchers grouped together in an international society of posturography founded in Amsterdam in 1969, and their first congress was held in Madrid in 1971. The few clinicians who took part in the work of that society tried to make their problem understood; a doctor cannot make a stabilometric recording of his/her patients before they fall ill, whereas a fundamentalist can record his/her experimental subjects before and after the manipulation he/she performs on them.

The doctors' request was heard and a normalization committee was formed under the leadership of Kapteyn,[19] but at the Houston congress, it became clear that it was too late to propose international building norms for a stabilometric platform. Three different firms were already selling different stabilometric platforms in Japan, and it was impossible to arbitrarily choose one of them as the international norm.

The platform of l'Association Francaise de Posturologie

During the Houston congress, members of l'Association Francaise de Posturologie (AFP), aware of that international failure, expressed their hope that, at least in France, if not in Europe, a normalized clinical stabilometric platform could exist.[20] They immediately began writing specifications for the building of a standard platform. Several considerations guided their choices:

- The platform was dedicated to the clinicians, not specifically for the fundamentalists;
- Its cost should allow for wide distribution;
- Its achievements would be limited to the clinical study of what had already been studied in a laboratory.

The published norms[21] set the characteristics of three pressure gauges, their situation at the summit of an equilateral triangle, the rigidity of the plates, the height of the gauges, the sampling of the signal at 5 Hz, etc. The prototype of this platform was used for the first statistical study of the values and repeatability of stabilometric parameters obtained in strictly normalized examination conditions (subject's position, environment, instructions).[22]

Since that time, every new platform built has provided a new opportunity for statistical analysis of the values of stabilometric parameters obtained in AFP normalized conditions.[23,24,25]

The stabilometric platform measurements

The stabilometric platform measures, during the recording, the position of the center of pressure, expressed in a bi-dimensional referential whose plane lines up with the one of the bases of support. By convention, the origin is set at the barycentre of the bases of support. The center of pressure nearly never merges with the projection of the subject's center of gravity on the plane of his/her bases of support because the human body is nearly never in a state of balance. But the center of pressure keeps shifting on both sides of the projection of the center of gravity in order to stabilize it, as in the tactics of the broom.[26] Therefore, the center of pressure shows a quick sway around the slower sway of the center of mass. As shown by frequency analyses statistics[27] and the diffusion analyses, that quick sway of the center of pressure is not controlled. What is controlled is the slow sway that corresponds to the movements of the center of mass.[28]

From that signal, it is possible to obtain most of the measurements of interest to the therapist:

- The mean position of the vertical of gravity, X-mean and Y-mean, eliminate the noise of the center of pressure (normalized parameters);
- The standard deviation relative to that mean position, whose more rigorous expression is given by the surface of the confidence ellipse containing 90 percent of the sampled positions of the center of pressure (normalised parameter);
- The energy spent can be roughly evaluated by the ratio between the total length of the position shifts of the center of pressure and the surface in which it evolves: length as a function of area (LFA);
- The measure of muscular stiffness by the weighted standard deviation of the displacement speed of the center of pressure as a function of the Y (axis-mean position), also known as the VFY, stabilometric parameter is still being debated;
- The range of postural sway, in X and Y, in function of the frequencies proved repeatable for the same subject and has consequently been studied statistically in the 0.2 Hz frequency band in a normal subject (normalized parameters);
- The integration of visual afferent information in postural control is evaluated by the Romberg Quotient—a simple ratio of the area parameters in both visual situations, open and closed eyes (normalized parameter);

The function of inter-correlation between the frontal and sagittal postural sway provides a test for their independence, which is the normal situation.

The platform as a measuring instrument

As the stabilometric platform provides numbered evaluations of physical dimensions expressed in the metric (CGS) system, it has the potential status of a measuring instrument. However, no stabilometric platform can really be considered a measuring instrument because no platform builder provides a study of the uncertainty of their measuring instrument. How can you be sure of the truth of the measurements given by that kind of instrument?

The uncertainty α[29] of a measuring instrument is expressed by an unidimensional ratio:
$\alpha = \Delta i/i$, where Δi represents the deviation from the true value of a given measure i.

In the absence of advanced studies on the uncertainty of the acquisition chains used in stabilometry, the only piece of information we have is their theoretic resolution, limited to about 0.16 N (Newton) by the current use of 12 byte digitizers for the reading of a full scale of about 650 N. Knowing that one overlooks a series of uncertainties about the measuring instrument (uncertainty of accuracy, rapidity, stability, etc.), one can say that the deviation from the true value of a given measure i is, at least, around 0.16 N, $\Delta i = 0.16$.

The very approximate expression of the uncertainty of the forces measurement, thanks to the current chains, therefore becomes $\alpha = 0.16/dF$, where dF represents the force variation measured by each of the gauges. So, such a measuring instrument is still imprecise, but many studies have evaluated the real contribution of a stabilometric platform, especially in estimation of the acute postural system.

Conclusions

Much of the development in measurements of posturology is based on fundamental research. Clinical research has shown that such measurements of posturology are not only useful, but compulsory. Let us hope that

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Program Chair

Bruno Chikly, MD, DO (UK) is a graduate of the medical school at Saint Antoine Hospital in France, where his internship in general medicine included training in endocrinology, surgery, neurology and psychiatry. Dr. Chikly also has the French equivalent of a Master's degree in psychology. He received a DO degree from the European School of Osteopathy in the UK, and a PhD in Osteopathy from the Royal University Libre of Brussels in Brussels, Belgium. He is the author of the book *Silent Waves The Theory and Practice of Lymph Drainage Therapy*, as well as the DVD *Dissection of the Brain and Spinal Cord.*

"I know that the normal brain lives, thinks and moves within its own specific membranous articular mechanism", Sutherland WG, *The Cranial Bowl,* Free Press, 1939.

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Osteopathic treatment of chronic gonalgia in the elderly: Changes in pain and posture

Yannick Huard, DO (Fr), ScM

Introduction

Posture corresponds to maintaining all or part of the body in a reference position. Amblard, et al., proposed to characterize posture in terms of two properties: orientation and stabilization.[1] The latter refers to the concept of balance. Balance control is a specific aspect of postural control that is particularly developed in mankind, due to the natural instability of the bipedal stance.[2, 3] By aging, posture changes[4] and trouble with locomotion in elderly people can have a physical impact, and also lead to psychological disorders due to isolation.[5] Chronic gonalgia with mechanical origin often affects the elderly by an arthrosis process.[6,7,8]

Osteopathy is a manual medicine known worldwide, but its results are not necessarily widely published. To promote scientifically the preventive nature of Osteopathy, we implemented a study to objectify the effect of an osteopathic treatment on chronic gonalgia in the elderly. The main objective of our experiment was to verify if the treatment favorably influenced postural balance and the intensity of pain.

Keywords: posture, gonalgia, elderly, stabilometry, Osteopathy

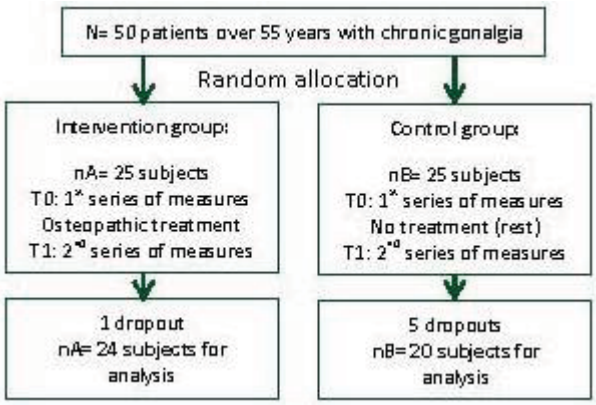
Methods

The study utilized a randomized controlled trial of 50 healthy volunteers over the age of 55 years, not having fallen in the previous year. The criterion for inclusion was chronic gonalgia without any central or peripheral nervous system pathology. All the experimental subjects were recruited from the private clinic of the Ecole Supérieure d'Ostéopathie (ESO-Paris) at Champs-sur-Marne (France). They were all healthy, living at home and independent, but were sedentary and suffering from chronic gonalgia with low to moderate intensity.

The criteria of judgment for the study were the Visual Analog Scale (VAS)[9] for the intensity of pain, and three stabilometric criteria[10,11,12] (X-medium for symmetry of muscle tone, Y-medium for anterior/posterior stability and length according to surface for the expenditure of energy). During the study, we used the VAS and took a series of measurements on the stabilometric platform (platform Feetest 01 Technoconcept® using Posturewin software), each just before the treatment (Group A) or rest (Group B) and two minutes after. The entire process took 30 minutes for each subject. We then carried out a statistical analysis of the four criteria. We used the Shapiro-Wilk test for the data, then the student's t-test (for variables with a normal distribution) or a nonparametric test.

Results and Discussion

The results for the four criteria show a difference between the intervention group and the control group. Only the X-medium was not significant, although there was a



Study Flow Chart

Parameters	T0	T1	*p-value***
X-medium A (mm)	0,3 ±3,8	-1,6 ±2,7	p=0,15
X-medium B (mm)	-1,7 ±3,0	-1,5 ±2,9	p=0,94
Y-medium A (mm)	-26,6 ±13,8	-1,9 ±10,4	p=0,0000
Y-medium B (mm)	-29,6 ±13,2	-30,3 ±11,1	p=0,73
LFS* A (UC)	1,25 ±0,1	0,8 ±0,1	p=0,0000
LFS* B (UC)	1,24 ±0,1	1,3 ±0,1	p=0,61
VAS A (/100)	34,1 ±9,9	15,3 ±5,9	p=0,0000
VAS B (/100)	33,8 ±3,8	32,9 ±7,0	p=0,83

*: length according to surface ** : the significant level is 0.05

***Table 1**. Summary and results*

tendency (p=0,15). It is very interesting that the parameters of the platform change seamlessly with the intensity of gonalgia. Once again, we can say that posture tends to change according to pain acuteness. In Group B, overall, rest does not change any variable, while, in Group A, the osteopathic treatment influences the parameters. The results suggest that the subjects still suffering from gonalgia continue to maintain their posture to avoid any deviation that may cause a painful reaction, while the subjects no longer suffering do not control their posture much more.

Conclusions

During this study, we attempted to assess the short-term influence of an osteopathic treatment on gonalgia in elderly sedentary people not affected by great degeneracy. The osteopathic treatment relieved the gonalgia immediately and effectively modified posture. We cannot deduce that this state is maintained over the short term and is adaptable in another context. Even if the results seem encouraging, they represent an intermediate step involving a better understanding of the pain process and the most appropriate treatment aimed at the preservation of health.

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20 hours of AOA Category 1-A credit is anticipated.

Program Chair

Jay B. Danto, DO, is a 1994 graduate of Michigan State University College of Osteopathic Medicine. He is board certified in Neuromusculoskeletal Medicine/ Osteopathic Manipulative Medicine and Family Practice, and serves as an associate professor at Kirksville College of Osteopathic Medicine. Dr. Danto has obtained a Certificate of Special Proficiency in Osteopathy in the Cranial Field and training from the Helm's-UCLA Medical Acupuncture Training Program. He is the author of many articles on osteopathic philosophy and education, including the textbook *Normalization of Muscle Function* and a book for patients called *Healing & Anti-Aging for Your Back & Neck Pain*.

Course Times

Friday and Saturday: **8:00 am - 5:30 pm** (breakfast and lunch provided)
Sunday: **8:00 am - 12:30 pm** (breakfast provided)

_____ I require a vegetarian option
_____ I require a gluten-free option

Course Location

University of Medicine & Dentistry of New Jersey
School of Osteopathic Medicine
One Medical Center Drive, Stratford, NJ 08084
(623) 572-3215

Travel Arrangements

Call Tina Callahan of Globally Yours Travel at 1-800-274-5975. Area hotels include the Hampton Inn (856-346-4500) and the Wingate Hotel (856-627-1000), both located in Voorhees, NJ.

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June 14-16, 2013

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- ☐ Manuscript formatted in Microsoft Word for Windows (.doc), text document format (.txt) or rich text format (.rtf)

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January 11-13, 2013
Ligamentous Articular Strain/
Balanced Ligamentous Tension
Course Director: David Kanze, DO
Associate Director: Kylie Kanze, DO
RVUCOM, Parker, CO
CME: 14 Category 1-A AOA credits anticipated
Phone: (512) 699-9461 E-mail: **sal_bert@hotmail.com**

January 11-13, 2013
Introduction to Osteopathic Medicine and
Evaluation & Treatment: Lumbar Spine
UNECOM, Biddeford, ME
CME: 20 Category 1-A AOA credits anticipated
Phone: (207) 602-2589 E-mail: **cme@une.edu**
Web site: **www.une.edu/com/cme/manualmedicine.cfm**

January 23-27, 2013
Nevada Osteopathic Medical Association
30th Annual Winter Symposium
Embassy Suites, South Lake Tahoe, CA
CME: 30 Category 1-A AOA credits anticipated
Phone: (702) 434-7112 Fax: (702) 434-7110
E-mail: **nvoma@earthlink.net**
Web site: **http://www.nevadaosteopathic.org/**

January 25-29, 2013
Craniosacral Technique: Part I
Course Chairperson: Barbara Briner, DO
MSUCOM, East Lansing, MI
CME: 35 Category 1-A AOA credits anticipated
Phone: (517) 353-9714 Fax: (517) 432-9873
E-mail: **cme@com.msu.edu**
Web site: **http://www.com.msu.edu/cme/courses.html**

February 6-10, 2013
Osteopathic Physicians & Surgeons of California
52nd Annual Convention
Hyatt Regency Mission Bay, San Diego, CA
CME: 36.5 Category 1-A AOA credits anticipated
Phone: (916) 822-5246 Fax: (916) 822-5247
E-mail:**opsc@opsc.org**
Web site: **http://www.opsc.org/**

February 16-20, 2013
Introductory Course: Osteopathy in the Cranial Field
Course Director: Eric J. Dolgin, DO
Associate Director: Paul E. Dart, MD
Hilton Hotel, Fort Worth, TX
CME: 40 Category 1-A AOA credits anticipated
Phone: (317) 581-0411 Fax: (317) 580-9299
E-mail: **info@cranialacademy.org**
Web site: **http://www.cranialacademy.org**

February 21-24, 2013
Florida Osteopathic Medical Association
110th Annual Convention
Bonaventure Resort & Spa, Weston, FL
CME: 34 Category 1-A AOA credits anticipated
Phone: (850) 878-7364 Fax: (850) 942-7538
E-mail: **admin@foma.org**
Web site: **http://www.foma.org/**

February 22-24, 2013
Changing Lives: Cranial Osteopathy's Gift to Children
Course Director: Margaret A. Sorrel, DO
Assistant Director: Miriam V. Mills, MD
Hilton Hotel, Fort Worth, TX
CME: 20.5 Category 1-A AOA credits anticipated
Phone: (317) 581-0411 Fax: (317) 580-9299
E-mail: **info@cranialacademy.org**
Web site: **http://www.cranialacademy.org**

March 1-4, 2013
Biodynamics of Osteopathy: Phase IV
Instructor: Donald Hankinson, DO
UNECOM, Biddeford, ME
CME: 22 Category 1-A AOA credits anticipated
Phone: (207) 781-7900 Fax: (207) 781-2900
E-mail: **ohmjh@aol.com**
Web site: **http://osteopathichealthcareofmaine.com/**

March 6-9, 2013
American Osteopathic Academy of Sports Medicine
28th Annual Clinical Conference
The Broadmoor Hotel, Colorado Springs, CO
CME: 27.25 Category 1-A AOA credits anticipated
Phone: (608) 443-2477 Fax: (608) 443-2474
E-mail: **info@aoasm.org**
Web site: **http://www.aoasm.org/**