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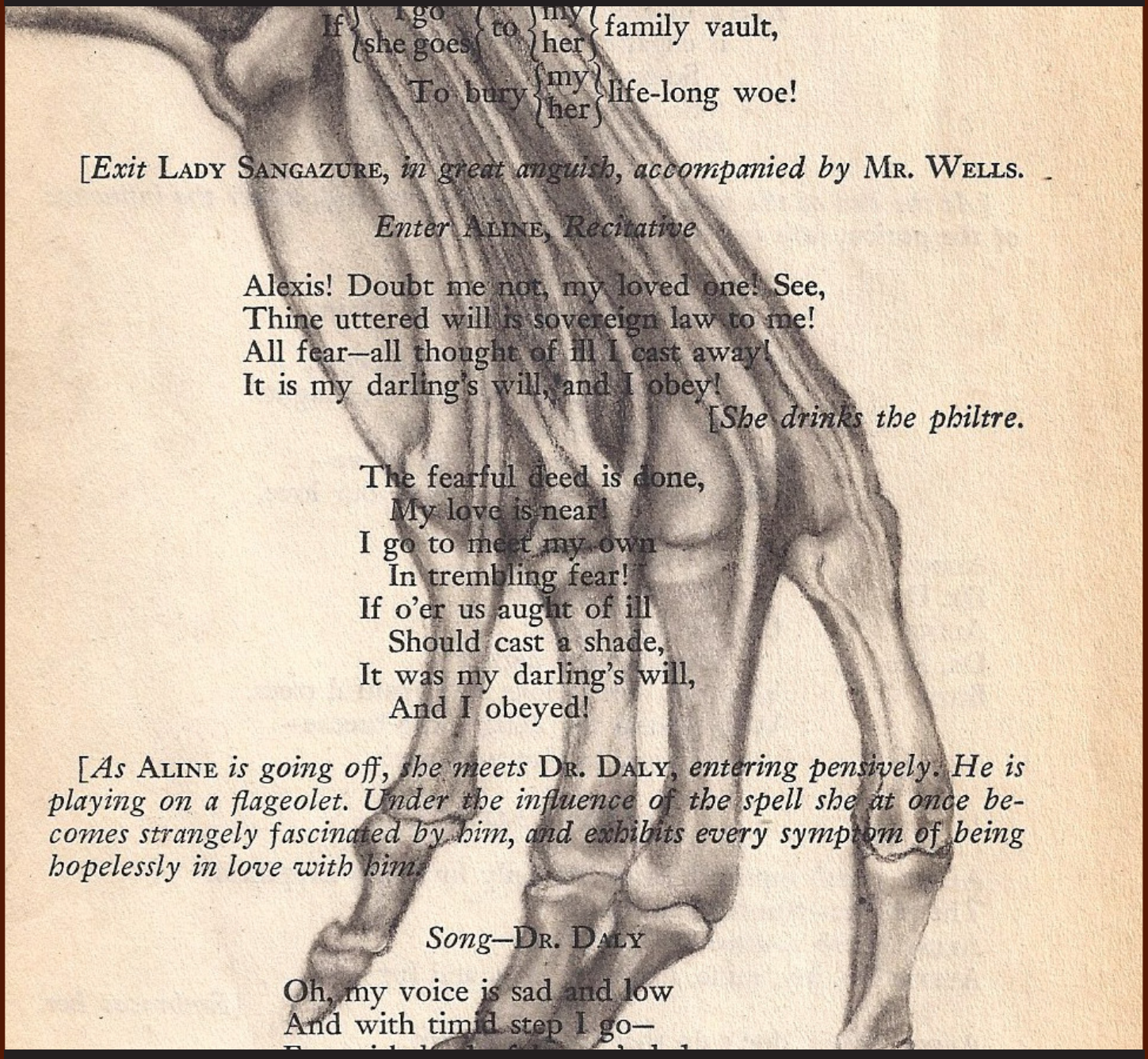

If { I go / she goes } { to / } { my / her } family vault,
To bury { my / her } life-long woe!

[*Exit* Lady Sangazure, *in great anguish, accompanied by* Mr. Wells.

Enter Aline, *Recitative*

Alexis! Doubt me not, my loved one! See,
Thine uttered will is sovereign law to me!
All fear—all thought of ill I cast away!
It is my darling's will, and I obey!

[*She drinks the philtre.*

The fearful deed is done,
My love is near!
I go to meet my own
In trembling fear!
If o'er us aught of ill
Should cast a shade,
It was my darling's will,
And I obeyed!

[*As* Aline *is going off, she meets* Dr. Daly, *entering pensively. He is playing on a flageolet. Under the influence of the spell she at once becomes strangely fascinated by him, and exhibits every symptom of being hopelessly in love with him.*

Song—Dr. Daly

Oh, my voice is sad and low
And with timid step I go—

In your hands now!...pg. 4

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THE AAO **FORUM FOR OSTEOPATHIC THOUGHT**

JOURNAL

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IN THIS ISSUE:

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In Your Hands Now!

Kate McCaffrey, DO

Dear future and present colleagues,

The topic of healing hands came to mind while teaching "meaningful touch" to our first-year medical students at COMP-Northwest in Lebanon, Ore. I began researching hand images and found that several predominant cultures have utilized different hand symbols: Native American, Jewish, Christian and Muslim, among others.

Some Native American tribes use the symbol of a hand with a swirl in the palm to refer to shamanistic healing. There appears to be a consensus that a shaman is a person of tribal origin who can travel between the spirit world and the natural world to invoke healing.[1,2]

The Jewish religion refers to a symbol of the right hand to represent the Hand of Miriam. Miriam is recorded as the biblical sister of Moses and Aaron. The Hand of Miriam is significant in hand symbology for its protective nature. History recorded that she protected her brother Moses' life by hiding him by the river so he would be saved from the Pharaoh's orders to have all male babies killed.

The Christian religion named a hand symbol after the Virgin Mary, called the Hand of Mary. This image is often used in the protection of expectant mothers and newborn babies.

Protective hand symbols are still used today to ward off the "evil eye." The evil eye is feared by many cultures historically as it is defined as an «ill wishing» on the subject or coveting of the subject's possessions. Some folklore attributes it to being able to cause harm in a physical way to the subject. Cultures have developed the hand symbol to «catch» the evil eye gaze.

In Hebrew, the hand is used as the letter "shin" and stands for the word, Shaddai, a word for God.

The Islamic culture has a similar hand symbol called the Hand of Fatima, named after Muhammad's daughter. It is not a coincidence that the name Fatima is a very popular girl's name in the Islamic world. Fatima is recorded as being an empowered woman in her time, often being a confidant and consultant to her father Muhammad. She was a "hands on" wife and mother, unlike her sisters who married into wealth and had servants. She was the people's heroine.

Hindu and Buddhist religions use mudras, which are an entire set of ritualistic hand gestures to symbolize different teachings and protection. Touching the thumb to the fourth finger, specifically, represents health.

In osteopathic medicine, the hand is significant for its use in physical and structural diagnosis, as well as in osteopathic manipulative medicine (OMM) or "hands on" medicine, as lay people call it. The hands are used to palpate, diagnose, treat, and comfort our patients. These psychomotor skills we teach to our students and use in our practices set us apart from our allopathic brethren. Our students learn to palpate, diagnose, and treat many levels of anatomy; including the dermis, epidermis, adipose, fascia, muscle, lymph, blood and osseous layers. They learn to use their hands and brains to visualize the underlying structures which may harbor somatic dysfunction, illness, injury or disease. They are taught to feel the difference between healthy tissues and acute or chronically injured tissues. Dr. A.T. Still emphasized health in the doctor-patient relationship: "To find health should be the object of the doctor. Anyone can find disease."[3]

As we hand off the torch to the next generation of osteopathic physicians, I like to keep in mind our incredibly talented middle and retiring aged osteopathic physicians. What worked to keep OMM alive? What can we pass on that is significant? What do we need to learn about the next generation in order to be effective teachers? What new technology and communication skills do we need to acquire to pass this gift on? And finally, what are we doing to integrate OMM into the clinical training years? Each day I seek new answers and challenges to these questions.

References

1. Shaman. Merriam-Webster.com. http://www.merriam-webster.com/dictionary/shaman. Updated 2013. Accessed Aug. 28, 2013.
2. Shaman. Oxford University Press. http://oxforddictionaries.com. Updated 2013. Accessed Aug. 28, 2013.
3. Still AT. *Philosophy of Osteopathy.* 1899.

The Extinction of Manipulative Medicine?

Janice U. Blumer, DO

For those of you out there that may be wondering: first off, I am a tried and true supporter of manipulative medicine, so much so that I quit my practice to teach it at an osteopathic medical school. That being said…I am worried that the future of the purely manipulative medicine osteopathic physician may soon be like a dinosaur: extinct.

From the beginning of the medical school education process, students in their freshly pressed shirts sweat nervously as a panel asks them to explain what interests them about an osteopathic medical school. Some spout the usual "I like the holistic approach" and very few delve into the roots and philosophy. Most who shadow an osteopathic physician see very little difference from our MD counterparts, unfortunately. We have forgotten, ourselves, what it means to be a DO.

Once they get in the front door, these promising students face astronomical educational loans for the privilege of gaining a diploma in four years. The rosy glow of acceptance starts to wear off when they see the numbers steadily increasing, and they start wondering how on earth they will begin to pay off that debt. Gone are the days when you can simply do an internship year and hang a shingle. Most insurance companies balk at you without a residency, and all hospitals require it. Again the numbers are steadily increasing and thoughts are driven towards the specialty that will generate the most income to pay off those pestering loans.

Additionally, students of today are different from those of bygone eras; they are fully hooked into the "information cloud" from day one of medical school. They don't just take your word for things no matter how well it is presented; they are looking online for the evidence and public opinion, and often creating their opinion before you have finished your sentence. The constant barrage of tests, as well as the multitasking required to be a medical student, creates another challenge. Their nervous systems are so sympathetically challenged it can be a struggle for them to "feel" anything, especially cranial.

Then you add the "insurance bullying" that is happening in practices across the nation, with insurance audits and withholding of payments and the student of today runs screaming in the other direction. "Why would I want to be in a practice setting where the payment is not guaranteed?" they might ask. Those of us in practice grumble about the "good old days" when you were paid without question, and what student wouldn't look at the purely manipulative practice as having a touch of the plague. We see this as a threat to our livelihood, not an opportunity for change in the profession and the insurance industry

Full 40-hour cranial courses are a thing of the past in most osteopathic medical schools of today. I believe our institution to be one of the last that still offers the program as a part of the curriculum. How many out there who practice manual medicine got their "spark" from one of these courses? It was like when you looked into a telescope for the first time as a little kid and saw the stars—it opened a whole new universe. Without these courses, how do students see the depth and breadth of what OMM can do?

Though I paint a macabre picture of the future of OMM physicians, I know there is hope out there, because hope rises up to the surface no matter how hard the world tries to sink it. The challenge in my opinion is that we as physicians need to evolve ourselves first. We need to change the way we think and teach, as well as change our perspective of how OMM fits into future practices. If we don't, OMM will die just like the dinosaurs, and with it will die our osteopathic distinctiveness. We need to offer the student a promising picture of the future of OMM in *any* practice setting. We need to stand up and fight the insurance companies for the right to be paid. We need to rethink how we teach cranial courses so they *fit the needs of the student,* not the dogma of our profession. The old saying "well if it was good enough for me" doesn't fit anymore. It takes initiative and a shrewdness to think outside the proverbial "osteopathic box." We need to provide the evidence base that supports the payment system, and no longer reply "we don't know why." Finally, we need to not be complacent, understanding that complacency is the nail in the coffin of OMM practices. If you are not inspiring others, you are being complacent. It is up to us to make this profession rise, just like hope. We can do it if we are unified and willing to see change as a good thing, constructive, and necessary for moving the profession forward.

AAO Calendar of Events

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

2013

September 28	Leadership/Communications Day—9:00 am, Mandalay Bay Resort, Las Vegas, NV
September 29	AAO Board of Trustees Meeting—8:00 am, Mandalay Bay Resort, Las Vegas, NV
September 30	Louisa Burns Osteopathic Research Committee Meeting—6:30 am, Mandalay Bay Resort, Las Vegas, NV
October 1	Publications Committee Meeting—6:30 am, Mandalay Bay Resort, Las Vegas, NV
October 1	FORCE Board Meeting—7:00 am, Mandalay Bay Resort, Las Vegas, NV
October 1	Education Committee Meeting—12:00 pm, Mandalay Bay Resort, Las Vegas, NV
October 1-3	*Osteopathic Approach to Common Office Complaints* (AAO Program at OMED) Laura E. Griffin, DO, FAAO—Mandalay Bay Resort, Las Vegas, NV
October 1-3	Osteopathic Education Service—Exhibit Hall, Mandalay Bay Resort, Las Vegas, NV
October 10-12	*Prolotherapy Weekend*—George J. Pasquarello, DO, FAAO; Mark S. Cantieri, DO, FAAO UNECOM, Biddeford, ME
November 8	AOBNMM Meeting—Crowne Plaza Hotel, Indianapolis, IN
November 9	AOBNMM Oral & Practical Exams—Crowne Plaza Hotel, Indianapolis, IN
November 10	AOBNMM Written Exam—Crowne Plaza Hotel, Indianapolis, IN
December 6-8	*Osteopathic Approaches to the Heart and Vascular System*—Kenneth J. Lossing, DO AZCOM, Glendale, AZ

2014

January 1	FAAO Applications Due
January 29	COFAAO Web Conference, 8:30 pm EDT
February 7-8	Education Committee Meeting—AAO Offices, Indianapolis, IN
February 14-16	*Basic Percussion Course*—Richard W. Koss, DO—TCOM, Fort Worth, TX
March 15-18	*New Approach to Osteo-Articular Manipulations Including the Superior and Inferior Limbs* (Pre-Convo) Jean-Pierre Barral, DO (France); Kenneth J. Lossing, DO—The Broadmoor, Colorado Springs, CO
March 17-18	*Osteopathic Approach to Common ENT Complaints of Childhood* (Pre-Convo)—Heather P. Ferrill, DO The Broadmoor, Colorado Springs, CO
March 17-18	*Fascial Distortion Model* (Pre-Convo)—Todd A. Capistrant, DO The Broadmoor, Colorado Springs, CO
March 18	COFAAO Meeting—The Broadmoor, Colorado Springs, CO
March 19	Board of Trustees Meeting—8:00 am, The Broadmoor, Colorado Springs, CO
March 19	Board of Governors Meeting—1:00 pm, The Broadmoor, Colorado Springs, CO
March 19-23	AAO Convocation—*Trauma: An Integrated Osteopathic Approach* Denise K. Burns, DO, FAAO, Program Chair—The Broadmoor, Colorado Springs, CO
March 20	AAO Business Meeting of the Membership—12:00 pm, The Broadmoor, Colorado Springs, CO

Welcome Dr. Worden as *AAOJ* Associate Scientific Editor

Please welcome Dr. Kate Worden as our *AAOJ* Associate Scientific Editor.

Dr. Worden received her DO degree from Michigan State University College of Osteopathic Medicine, her MS degree in Virology from the University of Chicago, and her BS in Microbiology from Purdue University.

She is board-certified in Neuromusculoskeletal Medicine/Osteopathic Manipulative Medicine (NMM/OMM) and Family Medicine and is one of 200 physicians in the world certified with Special Proficiency in Cranial Osteopathy.

She practices OMM at the Midwestern University/ Arizona College of Osteopathic Medicine Multispecialty Clinic in Glendale, Ariz., where she sees patients in the OMM Specialty Clinic, and precepts third- and fourth-year students and residents in OMM. She teaches several units in the first and second year OMM curriculum, is Course Director of the OMM Table Training Elective, and Director of the OMM Scholarship (Undergraduate Fellowship) Program. She has been very active in enhancing the quality of Clinical Research in the OMM Deptartment. Since Dr. Worden began focusing on research projects in the OMM Scholarship Program in the last three years, her scholars have competed well in the AAO Research Poster Contest. In 2011 they submitted two posters which won first and third place in their divisions; in 2012 they submitted two posters which won a first place in one division; and in 2013 they submitted four posters, three of which won first place and one of which won second place in their divisions.

She also assists in providing OMM curriculum, hands on workshops, research support and faculty development in the MWU OPTI residencies. She is currently creating a new Competency-Based 3-year OMM Curriculum for AOA-approved residency programs which parallels the ACGME evaluation process to assist with anticipated future collaboration between residency programs. She is the AZCOM Principal Investigator/Site Manager for the DO TOUCH.net Physician Research Network. She is working with AZCOM and the Osteopathic Cranial Academy (OCA) to create a new OCA-approved 40-hour Basic Cranial Course. She just completed the program for the inaugural year of an NMM/OMM "Plus 1" Residency which began July 2012. She was the sponsor for their resident entry into the AAO Research Poster Contest in 2013 who also was awarded first place.

She has several scientific publications and has taught OPP and OMT at the local, state, national and international levels. In October 2011 she presented "Backpacks to Nintendo: How Technology is Changing Our Children's Posture," at the American Academy of Pediatrics meeting in Boston, Mass. She is a member of the AAO Louisa Burns Osteopathic Research Committee (LBORC), including subcommittees on Research Proposal Review and Research Poster Contest, the OCA Research Committee, and is an active contributor to FORCE. She created and co-chairs an AZCOM OMM Department Research Committee since 2011. She is a member of the MWU IRB and assisted the AZCOM Dean on the COCA Review Research Committee in 2012-2013.

Convocation's Coming!

March 19-23, 2014
The Broadmoor
Colorado Springs, CO

A wonderful opportunity to share vital knowledge with partners in Osteopathy, Convocation is not to be missed!

Brochures are coming soon, so sign up early!

Prolotherapy Weekend

October 10-12, 2013, at UNECOM in Biddeford, ME

Course Outline

Thursday, October 10, 5:00 pm - 10:00 pm: Physicians who have not taken a prior course in prolotherapy are required to attend this session. It will include an introduction to prolotherapy, wound healing, degenerative postural cascade, coding and billing.

Friday and Saturday, October 11-12, 8:00 am - 5:30 pm: Participants will be divided into two groups—beginners and advanced. These two groups will alternate between lectures in anatomy and injection technique, and time in the anatomy lab performing injections under supervision and reviewing prosections.

Principles of Prolotherapy by Cantieri MS, Pasquarello GJ and Ravin TH, will serve as the course syllabus. Please see http://principlesofprolotherapy.com/index.html for details.

Prerequisites

Functional anatomy: (1) Level I course or equivalent.

Participants must indicate upon registration whether they are a beginner or advanced prolotherapy student. If you are unsure, please contact Sherrie Warner at the AAO.

CME

20 hours of AOA Category 1-A credit is anticipated

Travel Arrangements

Contact Tina Callahan of Globally Yours Travel at (800) 274-5975 or globallyyourstravel@cox.net. A rental car is recommended since the campus is located about 15-20 minutes from most hotels and restaurants.

Course Directors

Mark S. Cantieri, DO, FAAO, is a 1981 graduate of Des Moines University College of Osteopathic Medicine, and is board certified in NMM/OMM. He has served on various hospital staffs as a consultant in OMM—treating newborns, post-operative patients and patients in intensive care units. He currently operates a private practice, Corrective Care, PC, in Mishawaka, IN, which specializes in the treatment of chronic musculoskeletal pain. Dr. Cantieri is a Past President and former Secretary-Tresurer of the AAO.

George J. Pasquarello, DO, FAAO, graduated from UNECOM in 1993. Board-certified in NMM/OMM, he has served as a Residency Program Director and Associate Professor of OMM at UNECOM. He has also worked as a clinical specialist at Maine Spine & Rehabilitation and University Healthcare. He is currently in private practice at East Greenwich Spine & Sport in East Greenwich, RI. Dr. Pasquarello is a Past President of the AAO.

Course Location

University of New England College of Osteopathic Medicine
11 Hills Beach Road
Biddeford, ME 04005
(207) 283-0171

Registration Form

Prolotherapy Weekend
October 10-12, 2013

Name: _____ AOA#: _____

Nickname for Badge: _____

Street Address: _____

_____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

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By releasing your fax/e-mail, you have given the AAO permission to send marketing information regarding courses to your fax or e-mail.

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Registration Rates

❒ $1,500 - I already own a copy of *Principles of Prolotherapy*

❒ $1,810 - Please order me a copy of *Principles of Prolotherapy*

I am a ❒ **Beginner** ❒ **Advanced** prolotherapy student.

Please notify us of any special dietary restrictions.

The AAO accepts check, Visa, Mastercard or Discover payments in U.S. dollars

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I hereby authorize the American Academy of Osteopathy® to charge the above credit card for the full course registration amount.

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Click here to view the **AAO's Cancellation and Refund Policy.**

Please submit registration form and payment via mail to the American Academy of Osteopathy,® 3500 DePauw Blvd., Suite 1080, Indianapolis, IN 46268 or by fax to (317) 879-0563. Or register online at www.academyofosteopathy.org.

The Use of Orthotics in the Reduction of Self-reported Pain Scores in a Veterans Affairs Population: a Retrospective Study

James A. Lipton, DO, CSPOMM, FAAO, FAAPMR, DAOBPMR

The views in this article are those of the author and do not reflect the official policy or position of the Department of Veterans Affairs or the United States Government.

Abstract

Object. Musculoskeletal pain can be the result of postural asymmetry with an unlevel sacral base. Here, the author describes experience with the use of orthotics to reduce self-reported musculoskeletal pain scores after leveling the sacral base in a Veterans Affairs population.

Methods. A retrospective review of self-reported pain scores in patients with musculoskeletal pain and sacral base unleveling who received orthotic correction in the author's clinic between June 2009 and September 2012. Patients first received a temporary heel lift and then custom-molded orthotics (CMOs). Patients who were lost to follow-up, or who were completely noncompliant were excluded from the original analysis, leaving a sample size of 111 patient self-reported pain scores. Data were analyzed through chi-square and t-test evaluations.

Results. The average pretreatment pain score (out of 10) was 7.07, falling to an average post-treatment level of 2.52. Eighty-seven percent of patients demonstrated compliance with the treatment prescribed, and among these patients pain scores improved 67.7% from initial heel lift placement to follow-up after treatment with CMOs. Patients who used the prescribed orthotics only intermittently showed a 41% improvement in symptoms. Examination of subjective pre- and post-treatment pain scores demonstrated a positive relationship to the improvement of pain ($p = 5.10^{-34}$) with the initial use of heel lifts followed by the use of CMOs.

Conclusions. The results of this review indicate that the use of heel lifts and custom orthotics in appropriate patients to level the sacral base correlates to a statistically significant decrease in average self-reported musculoskeletal pain scores post-treatment.

Key Words: Heel lifts, sacral base unleveling, leg length inequality, low back pain

Introduction

Chronic low back pain (LBP) has a wide differential diagnosis that encompasses mechanical and musculoskeletal complaints, infection, trauma, neoplasm, fracture, poliomyelitis, congenital defects, joint surgery complications, rheumatoid arthritis, and foot pronation.[1] Previous studies have also linked gait dysfunction, leg length inequality (LLI), and sacral base unleveling as causes of LBP.[1,2] Although there is disagreement in the literature as to the existence of an association between LLI and LBP[3,4] and also concerning precisely how much LLI must be present to reach clinical significance,[5,6] many patients with chronic musculoskeletal pain have benefitted from appropriate heel lift treatment.[7-13] The patients in the present study presented with myriad musculoskeletal complaints including cervical, thoracic, and lumbar pain, hip pain, knee pain, foot pain and combinations of all of these complaints. With treatment here the focus was to level the sacral base. Once it was established that the pain did not originate from an emergent cause, each patient was examined for sacral base unleveling associated with leg length inequality using physical diagnostic criteria (see *Methods*) and treated with a heel lift on the side of the LLI. An unlevel sacral base decreases the spinal column's ability to balance gravitational forces and can be associated with a gait dysfunction.[13,14] Maeda and colleagues[15] recently demonstrated that LLI can even affect dental occlusive forces. These unequally distributed forces have been shown to be harmful and to lead to degenerative changes. Harvey and colleagues[16] have demonstrated that LLI is associated with increased risk of knee osteoarthritis, and Golightly *et al.*[17] have shown this association with the hip as well.

The purpose of this study was to review the records of patients treated to level the sacral base through the use of orthotics and to assess patient self-reported musculoskeletal pain scores both before and after orthotic treatment to track any statistical improvement.

Methods

This study was approved by the Institutional Review Board. A retrospective chart review was done of all patients who were evaluated for and diagnosed with LLI due to sacral unleveling in clinic visits between June 2009 and September 2012. Patients who were lost to follow-up, who wore prescribed orthotics intermittently or a heel lift on the wrong side against medical advice, or for whom the data were incompletely recorded were excluded.

Prior to each patient visit, patient medical records were examined to rule out emergent, non-musculoskeletal, or surgical conditions as the cause of the pain, and a complete history was taken from each patient to verify the record. Imaging and laboratory studies were ordered when appropriate, but physical examination was the primary tool used for diagnosis. The physical examination used to determine sacral base unleveling included palpation of the sacral base and assessment of leg length. Four points were compared bilaterally: the medial malleoli, anterior superior iliac spines, inferior lateral angles, and sacral sulci. Visual analysis of gait was used to determine the presence for example, of pes planus or hyperpronation. Although some authors[18,19] have advocated the use of radiography to prove LLI, the author did not deem it necessary to subject patients to radiation for this purpose. The author has found physical examination to yield reproducible results and be adequate to the task of diagnosing sacral base unleveling.[12,13] Other authors have also reported success with physical examination (albeit using different methods) and support the conclusion that radiographic proof is not always necessary[9,20] in determining the need for orthotic treatment.

In patients in whom the sacral base was noted to be unlevel, a heel lift of six or nine millimeters was chosen and inserted into the patient's shoe on the side of the shorter leg. Patients with minimal LLI or those older than 59 years of age were typically given six-millimeter lifts; others received nine-millimeter lifts. Patients were then instructed to walk up and down the hallway with the heel lift in place for at least 1,000 feet before their posture was reexamined in the same manner. If the sacral base was then palpated as level with the lift in place, the patient was sent home with the lift and instructed to wear it at all times, except while in bed or bathing. There were no patients that failed to level. Patients were requested to return for follow-up within two weeks, and at that time CMOs would be ordered if the heel lift proved beneficial. The CMOs were prescribed to correct gait dysfunction and incorporated the heel lift in order to maintain sacral base leveling. The reason for this two-week trial was to screen for the rare patient whose muscle imbalance might be resolved by Day 14 of heel lift use. There was one such patient in this population, and in this patient the heel lift was discontinued and no CMOs were ordered. At follow-up, the same physical examination was performed as at the initial visit, with comparison of the four points bilaterally to determine whether the sacral base was level with the orthotics in place.

Results

Data were analyzed initially as a whole sample through chi-square and t-test evaluations. The sample was then substratified into groups of no-to-mild pain, moderate-to-severe pain, tobacco abusers, and patients compliant with treatment. These subgroups were examined with the t-test to derive the efficacy of the suggested treatment modality. Pretreatment and post-treatment averages and associated percentages between the groups were calculated from the substratified data sample.

This sample was evaluated on various levels. These data substantiate the benefit of heel lift placement and subsequent CMOs. Of the 111 patient records examined, 15 received follow-up within 30 days. These patients were only given heel lifts (no CMOs) by the cut-off time for record review, and demonstrated a 38.6% improvement in quantified symptoms with this treatment alone. The remainder were seen in follow-up from 30 to as many as 1,000 days after placement of CMOs.

The entire sample was evaluated through the use of chi-square testing and variable t-tests. Notably, the no-to-mild pain group and moderate-to-severe pain group demonstrated a significant relationship to the improvement of musculoskeletal pain with treatment ($p = 3.8^{-22}$). When the groups were recombined into a general pool and pain scores before and after heel lift treatment were examined, a positive relationship to the improvement of musculoskeletal pain ($p = 5.10^{-34}$) was again observed.

The average pretreatment pain score (out of 10) for this unstratified sample was 7.07, and following the use of orthotic inserts, the reported pain score fell to 2.52 on average within this group. Eighty-seven percent of the sample demonstrated compliance with the treatment prescribed. These patients demonstrated a 67.7% reduction in self-reported pain scores between initial placement of orthotic insert and follow-up. Patients who used the orthotic intermittently only showed a 41% reduction in pain scores.

Discussion

The hypothesis of this study was that patients would report a significant reduction in musculoskeletal pain scores beyond the placebo effect after leveling of the sacral base through appropriate use of a temporary heel lift and subsequent use of custom molded orthotics to correct gait mechanics. In the author's experience, the crucial factor for lift placement is not the presence of an LLI but whether the patient's sacral base is unlevel. The data reflect a reduction in pain scores that was correlated with leveling of the sacral base.

Despite the disagreement in the literature concerning the exact nature and existence of the relationship between LBP and LLI,[3-6] it is clear that musculoskeletal imbalances can lead to painful accomodative changes in the body. Based on their study of spinal motion in 22 healthy men with experimental LLI (induced with a three-centimeter heel lift), Kakushima and colleagues[21] demonstrated an "asymmetrical lateral-bending motion during heel-raising gait as compensation for the leg length discrepancy," leading to a larger maximum bending angle and a larger

bending velocity in the lumbar spine. They concluded that patients with actual LLI would be at greater risk for degenerative changes that could lead to disabling spinal disorders. Results of another experimental model of LLI by Maeda *et al.*[15] showed that these accommodative changes even extend to affect dental occlusion. Still other studies have demonstrated that the unequal loading in patients with LLI leads to increased risk of knee and hip osteoarthritis.[16,17]

If we accept that this unequal loading of forces on the body is sub-optimal , the question becomes whether a heel lift applied to the side of an LLI can help to restore balance. The results in the present study and previous studies in different patient populations[12,13] suggest that orthotics do exert a significant effect on sacral base leveling verified by palpation and subsequent reduction in self-reported pain scores. The words verified by palpation should be viewed with similar confidence to the words right on right forward sacral torsion verified by palpation. One can be properly and reliably trained to see and appreciate both, through proper osteopathic education and constant practice without the use of ionizing radiation. A heel lift applied to the wrong side can cause significant pain. Rancont[22] described a case of a 79-year-old male patient who began using a heel lift after total hip arthroplasty to correct a perceived LLI and subsequently developed intractable pain in his hip and groin. On osteopathic examination, this patient was found to have chronic psoas syndrome and no LLI. His symptoms resolved with osteopathic manipulative treatment and discontinuation of the heel lift. Although detrimental in this case, Rancont's report illustrates the causal effect of heel lifts to bring about postural change with subsequent effect on pain level.

Conclusions

The data demonstrate that the correction of sacral base unleveling using CMOs incorporating a heel lift is correlated with a statistically significant decrease in self-reported musculoskeletal pain scores. In addition to decreased pain scores, this intervention also leads to a palpable difference in sacral base leveling on physical examination post-treatment. Because heel lifts and CMOs constitute such a simple, cost-effective, and noninvasive treatment resulting in the reduction of self-reported musculoskeletal pain, the presence of an unlevel sacral base should suggest the need to consider using orthotic correction to level the sacral base in an effort to reduce patient self-reported musculoskeletal pain.

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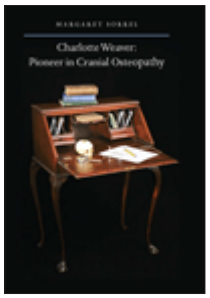
Book Review—Charlotte Weaver: Pioneer in Cranial Osteopathy, Edited by Margaret Sorrell, DO

Thomas Byrnes, Jr., DO



As I read this book, based on the work of Charlotte Weaver, DO, I absorbed the impression of a courageous and remarkably intelligent woman, possessed of a broad range of education, experience and ideas. This book is not a light read. It wasn't meant to be. Charlotte Weaver wasn't addressing a casual audience and neither is Dr. Sorrel. You will have to work to enjoy the rewards this book has to offer. It was worth it.

As one whose reason for becoming a physician is embodied in the potential of the application of the concept of osteopathy in the cranial field (OCF), initially I was a bit intimidated; would the book shake the foundation of this precious concept? Would it challenge in some jarring way, or undermine the reassuring integrity of practicing osteopathy in the cranial field? Was this a dark and dirty secret that had been suppressed by "mainstream Sutherland Cranial" (irony here folks) advocates? It turned out to be both more and less complicated than that.

As William Sutherland is recognized as the father of osteopathy in the cranial field, I believe that Charlotte Weaver could well eventually be recognized as its long lost mother. This will be no detriment to Sutherland or his own amazing body of work. If only a portion of their ideas "get legs" through modern research and "run" till clinical applications are delineated and generally recognized for their true value, humanity and the field of human health will be so much the richer. The idea that these two were independently developing extensions of A.T Still's science of osteopathy was fascinating in its own right. The image of two of his early pupils, toiling on individual advanced exploration, at the imperative of the great visionary himself, sets the stage for a deliciously intriguing story in itself, the truthful details of which we may never know.

I find the ideas of Charlotte Weaver and Will Sutherland intersecting at specific points. The first instance occurs in the Summary paragraph of the Précis to Part III:2 "The Prosencephalon & the Mesencephalon:"

> " …the relationship of the three intracranial fossae to the three cranial vertebrae. The contours of the dural membranes and their points of attachment on the plastic base allow for tensing and relaxing of the tympanum sellae, which influences pituitary function. Venous sinus drainage is influenced by the functions of the dural layers of the falx cerebri and the tentorium cerebelli."

The second is in Weaver's recognition of the potentially enduring effects of birth trauma. Third is in Dr. Magoun's book, "Osteopathy in the Cranial Field", second edition,

pages 44-45 in the section of the description of ossification of the sphenoid:

> "Embryologically there is some basis for thinking that the sphenoid and occiput may be modified vertebrae. Study of the developmental characteristics would suggest that the dorsum sellae and its parts may represent one unit; the sphenoid and its parts, a second unit; and the occiput with its parts the third. Certainly, the intervening structures which exist early in life resemble true intervertebral discs, particularly at the sphenobasilar synchondrosis. If there really is a basis for such an assumption, it adds further credence to the possibility that intelligent osteopathic methods are applicable in the cranium."

It is said that genius is looking at what everyone else is looking at and seeing what no one else sees. Through this book, Dr. Sorrel provides us an opportunity for a detailed look at the genius of Charlotte Weaver. What amazed me as I read, and amazes me still, is that many of these ideas, 70 years later are still unexplored scientifically. Although, as you would fully expect, some of her concepts have been shown incorrect or outdated by advances in the various sciences, e.g., with regard to the classification and function of WBCs, the major concepts examined in this body of work are still novel and some truly stunning in their potential. Additionally, her proposal and observations ought to be quite testable by current and developing technology used in a variety of fields.

This book raises many more questions than it answers. It is a veritable goldmine of research ideas. There are people in fields that did not exist in her time that should be intrigued and capable of again putting these ideas into motion. Embryologists, anthropologists, neuroanatomists, molecular developmental biologists, and applied anatomists and neurophysiologists, to name a few, should find that there are many researchable and novel nuggets to be mined here. Some are so novel and potentially significant as to produce Nobel caliber recognition for the intrepid researcher(s) brave enough to follow the possibilities and develop research that should be done. Application of these ideas will, initially at least, be left to skilled empiric practitioners of OCF. Charlotte Weaver was a woman ahead of her time. In a sense, she is still ahead of our time. Consider her work evaluating the kinematics and physics of skull trauma and the effects of such trauma on the function and structure of the skull. Her research is even more relevant today than when she wrote about it, given the renewed interest in the signature injury (TBI) of the conflicts in Iraq and Afghanistan.

Her theories on how cranial base distortions affect cerebral blood flow should be calculable by someone who knows how to calculate laminar and turbulent fluid flows and predictable perturbations caused by flow changes and irregularities induced by the inner surface of a fixed but flexible pipe, which should be measurable with Doppler ultrasound, MRI, PET scan and/or fMRI. Clinical effects could be hypothesized, tested against computer modeling and the clinical effects observed, measured and then followed longitudinally.

Her proposition that a notochord remnant forms the posterior third of the posterior third of the pituitary can and should be evaluated by modern cellular and protein labeling techniques. This island of tissue, affixed to the posterior sella, functioning as the controller gland for mesodermally derived tissues in the body adds a significant specific direction for potential research and gives new depths to our reasons to heed Still's guidance to "look to the fascia."

Some of the concepts offer less potential for development but do allow an historic glimpse onto the mindset of the times. As with the work of Still and Sutherland, osteopathy in general, and OCF specifically, studying Charlotte Weaver's work on the cranium means stepping out in a truly novel direction as far as concepts of health and humanity, not just expanding the cranial component of osteopathy. Integrating these ideas into daily practice forces one to remember that not all that has value is wildly profitable, contrary to the current default standard of value that is the main driver of efforts in the American healthcare system today. Her following comments show that she was truly and widely contemplating the bigger picture: "Forward evolution of the phylum is dependent on the ability of the organism to form successively more advanced crystals." Crystals (cerebrin) or pigments, which (found only in vertebrates with a cerebrum) are structured to absorb energy at specific frequencies or vibrations.

As one who entered the osteopathic profession at a time when there was a relative dearth of new osteopathic publications, my head spins when I look at the plethora of new books that we have at our fingertips today, I love it but most of them are variations on a theme or incremental additions to our established core practices. All have value but few carry really groundbreaking, unexplored ideas between their covers. Dr. Sorrell's book on Charlotte Weaver's work does exactly that. Happy exploring!

I wish to express my heartfelt gratitude to Dr. Sorrel for her efforts in carrying this immense undertaking through to publication.

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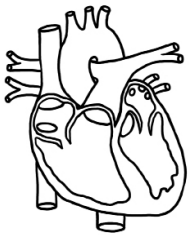
Osteopathic Approaches to the Heart and Vascular System

December 6-8, 2013 at AZCOM in Glendale, AZ

Course Description



This class will explore the heart and vascular system aspects of neuroregulation, viscoelasticity and compliance, micro perfusion, mechanical tension, function and dysfunction.

Participants will palpate, diagnose and treat the heart muscle, valves, connective tissue structures, cardiac coronaries and lymphatics, coronary conducting system, cardiac plexus and brainstem, as well as sensory and emotional connections.

It will cover the venous system with the superior and inferior vena cava, portal vein, lumbar plexus and sigmoid/rectal plexus.

It will also address the major visceral arteries of the thorax, head and neck, and upper extremities (aorta, pulmonary vessels, subclavian, common carotid, facial artery, carpal tunnel area, thyroid vessels, internal carotid and breast vessels).

Participants will start cross-correlating osteopathic diagnosis and treatment with oriental medicine by palpating the meridians pre and post treatment, and using the "healing sounds."

If time permits, the vessels of the abdomen will begin to be covered.

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 the AAO President-elect and is a member of the AAO Board of Trustees.

Course Times

Friday, Saturday and Sunday: 8:00 am - 5:30 pm
Includes (2) 15-minute breaks and a (1) hour-long lunch.

Breakfast, lunch and coffee breaks will be provided
____ I require a vegetarian option
____ I require a gluten-free option

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 1-800-274-5975. Locals hotels include the Country Inn & Suites in Phoenix (1-800-230-4134) and the Quality Inn & Suites in Glendale (1-800-230-4134).

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December 6-8, 2013 at AZCOM

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Fracture as a Result of Volcano Boarding

Tiffany R. Palmer, BS, MS IV; Ross Davidson, BS, OMS II; John Cloud, BS, MS IV; Tyler Cymet, DO; Kevin Marberry, MD

Introduction

Volcano-related sporting activities are a relatively new phenomenon with expected injuries resulting. The sport of volcano boarding involves the travel of the participant down the fine particulate ash-covered slope of a volcano on a toboggan or surfboard. Because of the propensity to injury, this extreme sport has been banned in all countries except Nicaragua. To the authors' knowledge, this is the first report published on volcano boarding injuries.

Case Presentation

A 27-year-old Australian female arrived at the hospital via ambulance following a volcano boarding collision earlier that day. The patient had difficulty moving and "couldn't catch her breath" after the accident. While still at the scene of the accident she rated her pain a 3/10 and non-radiating, yet she felt like she could not move. She was only able to wiggle her toes and stated that she was unable to stand or change position. When she was touched in the area that was impacted by the sled, the patient reported the pain jumped to a 10/10 and was a sharp, stabbing pain that did not radiate. She had volcanic debris in her hair and several abrasions with debris present on her back. The patient was diagnosed with a fracture of the left L3 transverse process, a soft tissue hematoma and paraspinal musculature edema.

Conclusion

This is an original case report in sports medicine highlighting the extreme sport of volcano boarding and injuries that may result. Expected injuries are reviewed and compared to sports with similar risks including tobogganing, mountain biking and snowboarding.

Introduction

We are reporting the first volcano boarding accident resulting in injury. While it is likely that the sport has resulted in injuries in the past, to the authors' knowledge there are no reports in medical literature regarding volcano boarding related injuries.

Although outlawed in every country except Nicaragua, there continues to be a large attraction to volcano boarding. It is difficult to assess the injury rate associated with volcano boarding accidents, but it is likely this is not the first. The sport has been around for years and is similar to tobogganing, which resulted in 55 accidents reported in one season alone.[1] This report offers some insight into one of the more severe injuries, a fractured lumbar vertebra with a resulting ten-day hospital stay. Additionally, we have provided background on the sport and other injuries that could easily result from volcano boarding accidents.

Case Presentation

A 27-year-old Australian female presented via ambulance to a private hospital in Leon, Nicaragua, following a volcano boarding accident earlier that day. The patient was on descent when she was struck on her left lateral side by another volcano boarder and sled. The patient was thrown off her board and landed, striking her abdomen, on volcanic rocks. The patient had difficulty moving and "couldn't catch her breath" after the accident. While still at the scene of the accident the patient rated her pain a 3/10 and non-radiating, yet she felt like she could not move. The patient had a full range of motion in both arms, but was only able to wiggle her toes in her lower extremities. She stated, "I was unable to stand or change position and was unable to flex my hips without assistance." When touched in the area that impacted with the other boarder's sled, the patient stated the pain immediately jumped to a 10/10 and was a sharp and stabbing pain that did not radiate. She felt that she suffered a severe muscle spasm.

With assistance, the patient was able to ambulate to the base of the volcano where an ambulance met her about an hour after the accident occurred. The paramedics attempted to stabilize the injury by wrapping a bandage around her chest and the abrasions in the lower thoracic and upper lumbar regions. The patient refused this treatment, as the area of the injury was acutely tender and painful.

She was transferred to a stretcher and taken to a hospital, where an X-ray of her low back was taken approximately four hours after the accident. The attending reported no spinal damage. An intravenous (IV) fluid drip of 1000cc including 5% dextrose in water (D5W), 15 mg diazepam and 60 mg methocarbamol was started five and a half hours after the accident.

The next morning, 18 hours after the accident, the patient was taken for an ultrasound exam and fainted during the process. The exam showed no organ damage, no internal bleeding, and no bruising. She reported that the pain remained localized to her left lower back and did not change in intensity. Bending her knees and tiptoeing to the restroom relieved the pain. The patient continued to be infused with D5W, 60 mg dexketoprofen, 15 mg diazepam, and 1 g methocarbamol.

Review of systems was as follows. The patient experienced one "queasy" episode status post accident on day two, which quickly resolved. She denied fatigue, loss of consciousness, dizziness or headache. Head/Eyes: no blurred vision or vision changes. Ear/Nose/Throat: negative for nasal drainage and epistaxis. Cardiovascular: positive for heart palpitations. Respiratory: tachycardia with shortness of breath and short, shallow breathing, but it was limited to the time she was trying to get out of the way of other volcano boarders and resolved after she was safely out of the way. Gastrointestinal: negative for emesis, hematochezia, melena, abdominal tenderness or pain. Genitourinary: negative for dysuria, polyuria or hematuria. Skin: positive for scrapings and bruising, but it was limited to the trauma site. Neurological: numbness in right leg, which resolved with position changes. The patient denied other abnormal sensations or shooting pains.

Physical exam was as follows. General: well nourished, awake, alert and oriented. Head: normocephalic without abrasions (patient still had some volcanic rock debris). Eyes: pupils were 3mm equal, round and reactive to light, extra-ocular movements intact with the optic discs 0.3, and no retinal hemorrhages. Ears: tympanic membranes intact without bulging, fluid or hemotympanum present. Cardiovascular: regular rate and rhythm without murmurs, clicks, gallops or rubs. Lungs: clear to auscultation with symmetrical aeration. Gastrointestinal: bowel sounds were positive in all quadrants; abdomen was soft, non-tender, non-distended, with no hepatosplenomegaly.

At this time, the patient was asked to sit up for examination of her musculoskeletal and neurological systems. She preferred to stand, as her right leg felt numb at times (lasting for up to half an hour) and relieved with having taken pressure off her side. It was a struggle for the patient to get out of the right lateral recumbent position she had been in. She was able to change positions with moderate assistance from one person, but it was a painful process. She stood with most of her weight on her right leg and her left knee bent at about a 30-degree angle while standing on her toes. She was encouraged to extend the left leg and bear weight on it. Following that instruction, she was able to straighten out the leg to 10 degrees and flatten out her foot to a normal position. While she experienced no pain in that position, she quickly felt hot and light-headed, and appeared pale. The patient attributed these changes to fearing pain in the new position. The triple response of Lewis was performed and showed a more significant response in the paravertebral musculature on the left side. Her cervical lordotic curve in the cervical spine was flattened. The left cervical pillars of C3-6 were boggy, but not tender to palpation. The paraspinal musculature at T1-4 on the right had a similar fullness with fluctuant, boggy tissue texture changes that extended slightly medial to the mid-clavicular line. Right paraspinal musculature at T4-7 had similar tissue changes but to a lesser extent. The left paraspinal musculature of T7-9 to the left lateral ribcage was even more boggy, swollen and tender to palpation. The patient was re-assessed and was diaphoretic and short of breath.

Her blood pressure was 105/58 mmHg and her heart rate was 82 beats per minute. Due to her clinical presentation, the X-rays were re-examined and a fracture of L3 left transverse process of L3 was diagnosed.

Figure 1. Abdominal X-ray. This image, taken 4 hours after the collision, shows a fractured left L3 transverse process.

Status post injury day three

The patient was informed that she would remain hospitalized until she was able to ambulate and was stable on lower doses of pain medications. At this time, she continued to report the only dysesthesias as numbness in her right hip, relieved with position changes. The pain remained localized to her left lower back, described as dull and moderately controlled with her pain medicines. At this time, a full history and physical was performed as reported above. The patient's past medical, family and surgical history were unremarkable and non-contributory. She denied drug allergies, and her social history was negative for intravenous drug abuse, narcotics, and tobacco. The patient admitted to recreational alcohol consumption.

The subsequent evening, after not receiving any additional radiologic tests, it was decided that the patient was to be transported to Managua the following afternoon for an MRI. The MRI of the lumbar spine revealed a left L3 transverse process fracture, edema in the left lumbar paravertebral musculature and a soft tissue hematoma within the paraspinal musculature.

Discussion

This case brings to light this relatively new sport of volcano boarding and reviews the medical documentation of one case for injuries. Volcano boarding (also known as *volcano surfing* or *volcano sledding*) is a recreational activity performed in very few places around the world. In Nicaragua, on the volcano of Cerro Negro in the Cordillera de los Maribios mountain range, there are daily expeditions up to the summit where riders then descend a steep slope on nothing more than plywood that has Formica fixed to its bottom. The board also has a rope for the rider to pull up on to keep the nose of the board from collecting rocks.

Volcano boarding down Cerro Negro requires a 45-minute climb to the top of the active volcano. At the

top, the rider puts on a one-piece suit made of very thick cloth, as well as goggles and gloves. The 487-meter descent is greatest at approximately a 42-degree grade.[2] There are varying accounts of the speed recordings for the descent. Guides from a Leon hostel claim that the record is between 95 and 98 kph (59 to 61 mph), which they measured using a radar gun.

Figure 2. Volcano Cerro Negro, Nicaragua. Central America's youngest volcano formed in 1850 with about 23 observed eruptions. The most recent eruption was in 1999.[1]

The owner of this popular hostel in Leon, Nicaragua (approximately 15 miles northwest of Cerro Negro), claims to have invented the sport circa 2005.[3] There have also been rumored reports of volcano boarding on the volcano Pacaya in Guatemala, although it has been outlawed in Guatemala due to the death of two tourists from the activity.

Figure 3. The descent on Cerro Negro. A 487-meter descent with inclines reaching 42 degrees and top speeds of roughly 60 mph.

The act of volcano boarding requires balance and coordination to achieve the desired speed throughout the ride down the slope of the volcano. The rider must simultaneously lean back (in a partial "sit-up" position) and pull firmly on the rope to elevate the nose of the board to stop it from collecting rocks and slowing the speed of the ride. This position requires firm contraction of rectus abdominis, as well as the biceps, brachioradialis, rhomboids and middle trapezius, to pull the rope with the appropriate force. The rider must use the heels of their feet to steer the board by extending their hips and applying force downward. Force applied to the right of the sled will steer the sled right; force applied to the left will steer it left. However, it must be noted that too much force through the calcaneus of the foot will cause the rider to turn sideways and crash. Crashing may cause lacerations, scrapes and abrasions on any body part that comes in direct contact with the sharp volcanic rock. Even though the rider wears a thick suit, the rocks are still able to injure the rider. Potential injuries may also be suffered by competing riders on the volcano.

Approximately halfway down the side of Cerro Negro, the slope levels off then suddenly reaches its steepest point of 42 degrees. This leveling off of the slope does not allow the riders at the peak of the volcano to see the progress of the preceding riders. Therefore, if a spotter is not placed at the middle point of the descent to make sure the preceding rider is clear of danger and to signal the next rider to launch, collisions may occur and traumatic injuries may result from riders colliding. As seen in this particular case, the preceding rider had a sled that was much faster than that of the next rider (the patient). When the patient slowed down, eventually stopping, it allowed for the next rider to catch up and run directly into the patient's back, even though the second rider tried to steer the sled out of the patient's path.

The injuries of volcano boarding can be directly compared to other sports or activities involving similar equipment. Some of these include tobogganing, snowboarding and mountain biking.

Tobogganing is similar to volcano boarding because of the equipment used on the descent. A study on tobogganing was done between November 1996 and March 1997, which analyzed 50 tobogganing accidents and 55 injuries. The study showed that 63.6 percent of injuries were to the lower extremities with the most common injury being a knee sprain. The most severe injuries were fractures to the lower leg, ankle joint fractures and lumbar spine fractures.[2] An additional study on tobogganing in Canada showed that over the course of two years, there were 22 tobogganing-related injuries in children. Only one of the children was wearing protective headgear (compared to zero reported volcano boarders). The initial site of impact in these accidents was the head (59 percent), then the trunk and then the extremities.[4]

Mountain biking incurs similar injuries due to a rapid descent down a declining slope. The most common mechanism of injury is due to forward falling, which can result in serious cranial and thoraco-abdominal trauma.[5]

Figure 4. Volcano boarder. This person displays the riding equipment including the volcano board, cloth jumpsuit, gloves, goggles and a bandana worn around the face to protect the airways from dust.

Though not an activity normally associated with volcanoes, snowboarding and skiing require body mechanics similar to volcano boarding. There are 28 major volcanoes in the Cascade Range of the Pacific Northwest of the North American continent, which average around 15 meters of snowfall per year with several of the higher peaks available for year-round snowboarding/skiing.[6] A retrospective review of general snowboarding/skiing injuries over five years showed a total of 119 patients with thoracic and lumbar fractures. The total number of fractures was 146, with 114 of those classified according

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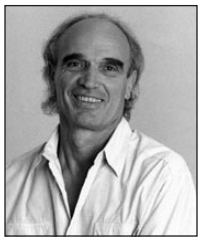

Jean-Pierre Barral, DO, Featured speaker

Jean-Pierre is an Osteopath and Registered Physical Therapist who serves as Director (and Faculty) of the Department of Osteopathic Manipulation at the University of Paris School of Medicine in Paris, France. He earned his diploma in Osteopathic Medicine in 1974 from the European School of Osteopathy in Maidstone, England, and went on to teach spinal biomechanics at the institution from 1975-1982.

He developed the modality of Visceral Manipulation based on his innovative theory that each internal organ rotates on a physiological axis. In collaboration with Alain Croibier, D.O., Jean-Pierre Barral has also developed the modalities of Neural Manipulation and Global Joint Treatment based on their on-going clinical research.

Dr. Barral holds the title of Curriculum Developer for the Barral Institute. Dr. Barral took the modalities and developed them into various manual therapy courses, which he taught since 1985. Dr. Barral has trained and certified a team of International Teachers who also instruct these courses around the world.

Since 1999 he has maintained a private practice in Grenoble, France, and has served as Chairman of Department of Visceral Manipulation on the Faculty of Medicine Osteopathy, Grenoble, France; the Chairman of Department of Visceral Manipulation on Faculty of Medicine Paris du Nord; and Academic Director of International College of Osteopathy, St. Etienne, France.

Kenneth J. Lossing, DO, Program chair

Dr. Lossing is a 1994 graduate of Kirksville College of Osteopathic Medicine. He completed internship and residency programs at Ohio University College of Osteopathic Medicine, and is certified in Neuromusculoskeletal Medicine/ Osteopathic Manipulative Medicine and Family Practice. Dr. Lossing studied under French osteopath Jean-Pierre Barral, DO, and is known internationally as a lecturer on visceral manipulation. He is the AAO President-elect and a member of the AAO Board of Trustees.

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to the AO Comprehensive Classification and with the other 32 remaining fractures being isolated transverse or spinous process fractures.[7]

In patients who have been in a high-speed collision, it is important to rule out common injuries including fractures, muscle sprains and strains, and meniscal or ligamentous strains or tears. Inability to ambulate after an injury, as seen in our patient, is a clinical sign with a high likelihood of a fracture. Further evaluation for a muscle strain or sprain is necessary if the swelling increases after the initial event or if there is gross range of motion limitations. Meniscal tears should be suspected with an increase pain or decreased range of motion six to twelve hours after the event, whereas a ligamentous injury is more likely if signs arise three days after the accident.

Fractures of the transverse vertebrae are seen in high velocity blunt trauma and are most frequently found in the lumbar spine, and often present in multiples.[8] A study of the frequency and importance of transverse process fractures of lumbar vertebrae looked at 536 consecutive helical abdominal CT patients with a history of blunt abdominal trauma. The 536 cases showed transverse process fractures in 39 patients. There were twelve patients with single fractures and 27 patients with multiple fractures. The most common transverse process fracture was of the L3 vertebra (n=25).[9] When initially evaluating lumbar transverse process fractures, the physician must maintain a high degree of suspicion toward many associated factors including but not limited to abdominal organ injury, visceral injuries, muscle sprains or strains and other vertebral injuries. Fractures involving the lumbar vertebrae transverse processes typically occur as the result of a direct force to the area. A statistically significant association has been reported between spinal fractures and abdominal injuries.[9] Although a transverse fracture of the lumbar vertebra can be a marker of associated visceral injuries including trauma to the abdominal viscera, spine, retroperitoneum, cranium and long bones,[10,9] fractures of the transverse processes of the lumbar spine can also occur in absence of other visceral and vertebral damage.[11] Unless there is marked displacement or angulation, transverse process fractures may be poorly visualized on plain film radiographs because of overlying gas and/or soft tissue shadows.[12,13] Of the 16 lumbar transverse process fractures discussed within a review by Harrington and Barker, numerous associated injuries were found in patients admitted to a trauma center: five chest injuries, one head injury, four splenic injuries, seven renal or bladder injuries, six general abdominal injuries, and five orthopedic injuries.[14] It is a common theme that isolated transverse process fractures are typically not associated with neurologic deficits or structural instability requiring neurosurgical intervention;[15] these types of fractures are often complicated by the major muscle groups attaching to the transverse processes.

The two primary muscle groups acting on the lumbar transverse processes are the psoas, which originates from the anterior surfaces of the transverse processes, and the quadratus lumborum, which originates from the 12th rib and the tips of the transverse processes of L1 to L5.[16] In severe lumbar transverse process fractures, there can be significant psoas muscle spasm, which causes an inability to straighten the back and legs simultaneously as seen in this patient.[17] Along with a possible psoas muscle spasm, a scoliosis that is convex to the side of the fracture can be an associated finding. This is due to the unopposed muscle action of the opposite side, a finding also seen in this particular case.[8] While associated muscle involvement and possible visceral injuries are important and should be considered in a differential of any lumbar vertebrae transverse process fracture, the risk associated with possible abdominal organ injury must be ruled out before progressing with treatment of the fracture or associated injuries. Transverse processes are located adjacent and posterior to the kidneys and liver and may directly damage these organs should an avulsion fracture occur. Alternatively, it may be that the large deceleration forces that result in these fractures may be responsible for the abdominal organ injuries. The clinical relevance to be noted when dealing with a fracture of the transverse process, the fracture should be considered a warning sign or possible marker of other more serious injuries, especially abdominal organ injuries. The physician should be alert to the high likelihood of these alternate injuries.[16]

Blunt abdominal trauma (BAT) can manifest a wide range of presentations, from a patient with normal vital signs and minor complaints to an obtunded patient in severe shock. The initial presentation may be benign, despite the presence of significant intra-abdominal injury. If evidence of extra-abdominal injury exists, the emergency clinician must assess for intra-abdominal injury, even in hemodynamically stable patients without abdominal complaints.[18] Small bowel/mesentery and splenic injuries tend to be more commonly associated with the mid to lower (L3–5) rather than upper (L1–2) lumbar vertebral fractures, whereas renal injury tends to occur predominantly in conjunction with the mid to upper lumbar vertebral fractures.[19] The insidious nature of blunt abdominal injury is borne out by the fact that more than one-third of the "asymptomatic" patients had abdominal organ injuries. While this patient did not have an abdominal organ injury, due to the complex nature of this type of injury, an elevated index of suspicion and a subsequent observation period are therefore necessary to achieve adequate care for patients subjected to blunt trauma.[20] Although abdominal injuries are found to occur in a minority of blunt trauma patients

suffering a fracture of the lumbar spine, and are most commonly found in association with multilevel vertebral fractures,[19] it is crucial to patient care that they always be included in the differential diagnosis and warrant adequate suspicion before moving forward.

Treatment

Fractures of the transverse process are treated symptomatically. No surgical intervention is needed. When considering treatment for an acute transverse process fracture, spinal adjustments to the lumbopelvic region are best delivered with an indirect technique until sufficient bony healing has taken place. Adjunctive therapies, such as rehabilitative exercises, ice, and nutritional counseling (to help facilitate healing), are an important facet of the care as well.[21] Currently, there is no statistical or clinical evidence for the effectiveness of treatment via bracing in patients with traumatic thoracolumbar fractures.[22] Anti-inflammatory and pain medications are an important part of treatment.

Conclusion

Volcano boarding is a relatively new "extreme sport" with many risks of personal injury and injury to others. While banned in most countries, this sport remains popular in Nicaragua, and physicians should be aware of the inherent risks involved and the methods to evaluate and treat these injuries. For the participant, care must be taken to avoid injury while boarding. If injury occurs, it is the responsibility of the medical staff to perform a thorough evaluation, scrutinize all imaging and perform secondary trauma examinations, so as not to miss occult injuries that may result in permanent and/or partial disability to the patient.

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Robert C. Fulford, DO

Dr. Robert C. Fulford's Basic Percussion Course

February 14–16, 2014 at TCOM

Richard Koss, DO

Course Description and Background:

At Dr. Fulford's last course in May of 1997, he expressed his desire to leave his ailing body after his scheduled presentation to the Cranial Academy in June. After demonstrating what he was going to present to the Cranial Academy, he asked Dr. Koss **(Program Chair)** and Dr. Rajiv L. Yadava to continue teaching his work to the Osteopathic profession. Dr. Fulford passed away four days after the Cranial Academy presentation.

This course has been restructured to provide the participant a more complete understanding and experience of Dr. Fulford's contributions to Osteopathy. Although hand and percussion techniques are included, the course emphasizes increasing the clarity of one's working knowledge. Based on the participant's inclinations, there is freedom within the curriculum to change the direction of what information is relayed. Time needed to assimilate what is taught will also be respected.

Prerequisites:

This Level III course is for DOs, MDs, dentists and students with a **40-hour approved Cranial course** and/or **prior training** and **experience in Cranial Osteopathy** or permission from the program chair.

Course Objectives:

- One will recognize that many of Dr. Fulford's ideas are rooted in Dr. Still's and Dr. Sutherland's teachings;
- One will begin to see that the results realized from the use of the percussor is directly dependent on the osteopath's understanding;
- One will see that the use of the percussor will save the physician time and energy; and
- One will appreciate that Dr. Fulford gave more to Osteopathy than a new technique.

CME:

22 hours of AOA Category 1-A credit is anticipated

Course Location:

Texas College of Osteopathic Medicine
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From the Archives: Structure and Function

The following is an interesting description of the fundamental concepts of physiology, and how they can be viewed in light of osteopathic principles. It is taken from pages 10–15 of Physiology: General and Osteopathic*, published in 1913 by J. Deason, ScB, MS, PhG, DO, who at the time of publication was the Director of the A.T. Still Research Institute in Kirksville, Mo., and former Professor of Physiology at the American School of Osteopathy in Kirksville. The book was published by the Journal Printing Company, also in Kirksville.* *– Raymond J. Hruby, DO, MS, FAAO*

The existence of all living organisms is dependent upon the intimate relations which exist between the various component parts or structures of the organism and the work or functions which these structures have to perform.

In primary physiology we are taught that "man is a machine" and that his various working parts have their specific kind of work or functions to perform and that, failing in this, a perversion of function results and this failure of the normal function means disease. The study of the fundamental relations of structure to function should then be the aim of every student of physiology.

By the term *structure* is meant the body framework, its organs and other constituent parts. The term *body tissue* is applied to a structural part of the body consisting of an aggregation of similar cells having a similar function or similar functions, e.g., bone, which forms the framework; cartilage, which pads the joints and allows movement without wear; muscle, the contraction of which causes movement of the body levers, the bones; and nerve tissue, which is the body messenger and serves to connect the various structures in their functional relations and to regulate these functions. It will, of course, be left for the histologist to explain the minute or microscopic structure of the various tissues.

Relations of Structure to Function—Function may be defined as the specific work of an organ or tissue of the body. An organ is a specialized structure whose function is some special kind of work. In order that any tissue or organ may perform its normal function it must itself be normal in its development, its growth, its cellular composition, and in its structural relations with other organs. The last of these requirements is probably most essential because, if the structural relations are right, normal development, growth, etc., will follow.

If, on the other hand, any abnormal structural relations exist, these may affect the blood or nerve supply or in some other way interfere with its development, growth, or the functional activities of its component cells, thus affecting the functions of the organ. It is well known that the functions of any individual structure depend not only on its own normal structural relations, but to some extent upon the functional activities of other structures. If the heart, for example, fails to pump the necessary amount of blood to any certain organ or if the nerve supply for any reason is insufficient, thus rendering the regulation of its functional activities abnormal, that structure fails to perform its normal kind or amount of work. Since the various organs of the body bear certain functional relationships to each other, any perversion of the functions of one structure may materially interfere with the functions of other structures, and thus we have an example of the unity of body structures and their functions.

This dependence of function upon structure may again be compared to the working of a machine. If at any time a certain mechanism fails in its proper adjustment the work of that part is impaired or lost, and in most cases the entire machine is valueless until this one part is repaired.

Structure Depends upon Function—In the above paragraphs it has been shown that normal function depends upon normal structure and now we must state the converse, *viz*., that normal structure is dependent upon normal function, which is also true. To illustrate we may use the example of the blacksmith's arm to show how cultivation of the function tends to develop and normalize structure, or on the other hand how, when one fails to take the necessary amount of exercise, his muscles atrophy and become weak. In future chapters the more complicated and intricate relations will be discussed which show these same principles.

Certain laws of physics apply also to the body as well as to other mechanisms. The laws of conservation and transformation of energy, for example, hold good for the animal machine. The source of energy is the food and air used as fuel. It may be transformed, transferred, or lost, but cannot be created within the body. The efficiency of the body machine is much greater than that of other machines, but here again the efficiency depends upon the degree of perfection of its structural relations.

Body Repair—The body machine has one marked advantage over other machines and that is that it maintains its own repair shop. Certain cellular elements of the body, the red blood corpuscles, serve to replenish the various tissues with oxygen and the blood in this and other ways repairs tissue as it wears and also furnishes material for energy to its muscles and other working organs. The blood also carries other cells, the white blood corpuscles, which may be called scavenger cells, whose function is to carry away waste and protect against the invasion of bacteria, etc.

From the above paragraphs it may be seen that the body is an automatic machine in that it repairs its own wear and regulates its own work. Normal structure and structural relations mean normal functions and this stated in

the converse, *viz.*, that normal function cannot result from abnormal relations, is the osteopathic theory of disease. Just so long as normal structural and functional relations of the body machine are normal the individual will show evidence of that phenomenon which we call life.

Physiology may be defined as that branch of science which treats of the various changes and processes occurring in the animal organism during life.

Physiological changes are those changes, whether physical or chemical in nature, which occur in the normal living body. The term metabolism is generally attached to these changes and usually applies to physiological chemical changes which occur in the various tissues. Metabolism may be either constructive, a building or forming process, anabolism, or it may be destructive, a breaking-down process, catabolism. Changes anabolic in nature occur in tissue building, cell formation, etc., in which protein material from the foodstuffs, for example, is built into living tissue substance; and changes catabolic in nature occur in the destructive oxidation processes of certain foods, carbohydrates, fats, etc., the result of which is the liberation of heat and other forms of energy which yield power to do work.

These changes occur in all living organisms, animals and plants and are necessary for the life processes of the organisms. In the lower forms of life, such as the amoeba, all necessary life processes can be effected in the one simple cell of which the animal consists.

There are certain essential functions necessary to the life of every living animal, regardless of its scale of development. These are known as the essential physiological functions of protoplasm. They are metabolism, which has been defined; movement, by virtue of which animals are enabled to move or change their environmental conditions, which in the case of the lowest forms consists of an amoeboid movement, by means of which the animal may adjust its body to new food supplies, etc.; the third function is growth, a process of continued constructive metabolism; fourth, reproduction, the process by means of which the animal reproduces its kind; the fifth, irritability, or the quality of responding to a stimulus. A sixth is sometimes given, which is a specific one and refers to some function of a specialized or highly differentiated structure.

In the higher forms of life these various functions are performed by organs highly differentiated and adapted for the performance of some one or more special functions. Movement in the higher forms, for example, is effected by the musculature, irritability by the system of nerves, etc. This differentiation of structures for the purpose of performing these special and separate functions enables the higher animals to do work and perform the various life processes much more perfectly, and constitutes a plan of physiological division of labor.

The Cell Theory—Early in the 18th century the theory was advanced by Schleiden and Schwann, supported by other observers, that the cell constituted the histological basis of all animal structure. Since that time various workers in the biological sciences have developed this idea into a very explanatory theory of all life processes, the main principles of which are discussed in the following paragraphs:

1. The cell constitutes the anatomical and physiological unit of the organism, and the life processes of the individual organism are determined by the nature of the various cells which compose it.

2. Anatomically the various cells have undergone various processes of differentiating changes during the phylogenetic evolution of the organism, and now in the higher forms of life these specially differentiated structures which have resulted have the power of performing specialized functions according to the nature of the structure.

3. The cell is to the organ as the organ is to the body; that is, the functional activities of the organ depend upon the nature of the cells which compose it, just the same as the functional activities of the body as a whole depend upon the nature of its various organs.

4. The unity of functional relationships of the body as a whole depends upon the completeness of the functional activities of its various organs, and in turn the unity of function of the organ depends upon the functional activities of its various cells.

5. Every cell in the organ bears a certain functional relationship to every other cell of that structure, every organ of the body bears certain functional relations to every other organ, and the maximum of perfection of the various functions of all cells and organs renders to the body as a whole the sum total of perfect functional activity or health.

6. By the physiological division of labor, then, all of the various structures have special functions to perform, and any one of these failing in its function may cause an unequal balance or perversion of function and the result is disease.

Since normal function can be effected only by normal structure and since also normal structural relations must exist in all tissues, because of the interrelations existing between the various structures, any perversion of structure may and usually will result in abnormal function, and this is the osteopathic theory of health and disease.

General physiology is that branch of science which

treats of the various functions of the living animal. Special physiology is a branch of general physiology which teaches the special functions of some specialized structure or structures. Human physiology refers to those physiological changes occurring in the human body. Cellular physiology refers to those physiological changes occurring in the cell. Osteopathic physiology is that branch of general physiology which considers especially the relations of structure and function and the unity of these combined functions.

Usefulness of Video Learning for Osteopathic Manipulative Medicine (OMM) Techniques in the Educational and Clinical Setting

Melissa K. Meghpara, OMS III; Michael J. Terzella, DO; Theodore B. Flaum, DO; Min-Kyung Jung, PhD; Sheldon C. Yao, DO

Abstract

Context

The current methods of teaching osteopathic manipulative medicine (OMM) may be improved by the incorporation of video learning into the curricula, an approach that has yet to be fully explored. Mann and Eland have demonstrated that student self-efficacy evaluations were higher with video learning versus instructor demonstration and paired practice for the Spencer technique.[1] Dilullo *et al.* have also demonstrated the use of video learning as a useful tool in anatomy dissection; however, it is necessary to expand the assessment of the usefulness of video learning to all OMM techniques in the learning laboratory and clinical settings.[2,3]

Objective

To measure student perception of the usefulness of OMM videos as a learning tool in the laboratory and clinical setting.

Methods

The study employed an online survey to evaluate the usefulness of OMM videos in improving the understanding of osteopathic manipulative treatment (OMT) for all current New York Institute of Technology College of Osteopathic Medicine (NYIT-COM) students in both the laboratory and clinical settings. Questions examined the reasons students used the videos (i.e., preparing for labs, exams, treating patients), how useful the students found the videos to be for each situation, the number of times the videos were viewed and if the students preferred to replace textbooks and onstage demonstrations with the videos. It excluded any student not currently enrolled at NYIT-COM and class of 2015 Academic Scholars. The study was conducted at the NYIT-COM in Old Westbury, New York.

Results

NYIT-COM survey respondents used OMM videos most frequently for OMM lab preparation and NYIT-COM exams and quizzes. Comparison of proportions of preclinical and clinical students answering positively to "If they would prefer to use the video as a supplement to reading the technique" found that 78.1% of clinical students answered positively and 21.9% answered negatively or neutral, while 59.2% of preclinical students answered positively and 40.8% answered negatively or neutral (p-value <0.001, OR = 2.46, 95% CI (1.64, 3.69)).

Conclusion

This study demonstrates that students in both the preclinical and clinical years of their training utilized OMM videos. Students either agree or strongly agree that the videos are useful and prefer the videos as a supplement

CME QUIZ

The purpose of the quiz, found on page 30, is to provide a convenient means of self-assessment for your reading of the scientific content in "Usefulness of video learning for osteopathic manipulative medicine (OMM) techniques in the educational and clinical setting" by Melissa K. Meghpara, OMS III; Michael J. Terzella, DO; Theodore B. Flaum, DO; Min-Kyung Jung, PhD; and Sheldon C. Yao, DO.

Please answer each question listed. The correct answers will be published in the December 2013 issue of the *AAOJ*.

To apply for Category 2-B CME credit, record your answers to the *AAOJ* CME quiz application form answer sheet on page 30. 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.

to onstage demonstrations. However, we found that students desire to replace readings with the videos if given the option. When structuring OMM laboratory time to maximize active learning, understanding student learning preferences plays an important role. Further research is needed to determine optimal methods of learning OMM in order to encourage knowledge and confidence with performing OMT.

Introduction

The education of osteopathic medical students (OMSs) during their first two years in medical school at NYIT-COM is heavily based upon onstage demonstrations and lectures as the primary methods of teaching OMM techniques. In the past five years, videos and active learning have become integrated with these traditional methods of teaching. Gleason *et al.* describe active learning as "an approach to teaching rather than a single, specific method…[that] can facilitate student engagement, enhance relevance, and improve motivation by actively involving students within their classroom and experiential learning environments."[4] Active learning is frequently associated with techniques where the students are directly engaged in their learning process, utilizing their own investigation, as opposed to passive learning, where the students are given the material through lectures without having to utilize their own efforts to process the material. The OMM Department at NYIT-COM began to utilize OMM videos in order for students to actively prepare for laboratory sessions and to have as a resource to utilize for examinations. Videos used at NYIT-COM demonstrate osteopathic diagnosis and treatment methods that are taught during the first and second year of medical school. An OMM department faculty member typically describes the techniques along with relevant anatomy and then demonstrates the techniques on a model patient.

Evidence supporting video learning of OMM techniques is limited. One study evaluating different learning methods for the Spencer technique has shown that students' average self-efficacy scores increase with independent practice time, which includes both a handout and video, versus simply using faculty demonstration or paired practice.[1] There is also evidence supporting the usefulness of video learning in anatomy dissection. Short video clips were used to demonstrate proper dissection technique and structures that should be visible to students as they progress through the dissection. Students found the videos helpful in preparing for lab dissections, studying for quizzes and exams, and they also helped to build confidence in identifying anatomical structures.[2] These anatomy video clips, in addition to the OMM videos used by some schools, can be considered learning objects, which are defined by Smith as "any grouping of materials that is structured in a meaningful way and is tied to an educational objective."[4,5] OMM videos are learning objects because they are structured around the performance of an OMM technique and are intended to educate students about the indications for and performance of the osteopathic techniques. However, it is not enough to use learning objects without knowing the impact of these educational tools. OMM videos should be evaluated for their usefulness, which the study defined as the videos' effect on student knowledge about techniques, their perception of the videos and impact in both the laboratory and clinical settings. This study aimed to determine the usefulness of OMM videos in both the laboratory and clinical settings, but also addressed the idea of active learning in the OMM laboratory.

Methods

The study employed an online survey to evaluate the usefulness of OMM videos to improve understanding of osteopathic treatment techniques for current NYIT-COM students in both the laboratory and clinical settings. The questions examined the reasons students used the videos (i.e., preparing for lab, exams, treating patients), how useful the students found the videos to be for each situation, the number of times the videos were viewed, and if the students preferred to replace textbooks and onstage demonstrations with the videos (see appendix A). The Academic Technology Group at NYIT-COM implemented the survey using SurveyMonkey©. Emails containing a link to the survey were used in the recruitment of subjects. Emails were sent one week and again two days before the survey closed (see appendix B and C). Students also received a reminder announcement in their OMM laboratory if they were a first or second year student (see appendix D). The study was conducted at NYIT-COM in Old Westbury, New York.

Variables that were considered in the study survey included gender, class year, usefulness of the videos for laboratory preparation, NYIT-COM exam preparation, board exam preparation, treatment of a person and future use of OMM. Academic Scholars were considered a variable because they spend an extra year teaching and practicing OMM. Academic Scholars may be biased since they teach OMM and therefore can potentially view the OMM videos more often than the other OMS. This was controlled for by omitting the class of 2015 Academic Scholars, who currently are teaching. Academic Scholars from the other classes self-identified within the survey. They were not controlled for as they are not currently teaching OMM and would not be using the videos more than other OMS. Variables that were not measured included exposure to OMM from sources other than NYIT-COM videos, assigned readings and onstage laboratory demonstrations.

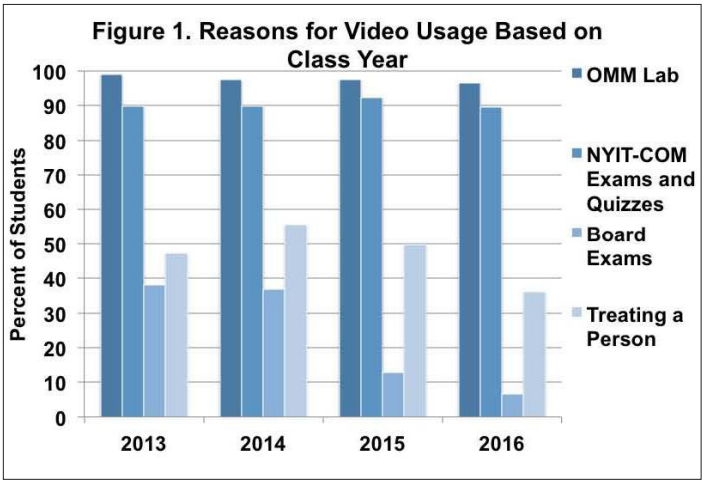
Inclusion criteria: Current NYIT-COM students.

Exclusion criteria: Students not currently enrolled at NYIT-COM and NYIT-COM class of 2015 Academic Scholars.

Statistical analysis: The median and the range were computed for ordinal data. The frequency and the proportion in percent were calculated for ordinal and nominal data. To compare the ordinal levels of the subjects' ratings among the groups of different class years, chi-square tests were performed. Odds ratios with 95% confidence intervals were calculated as measures of effect sizes.

Results

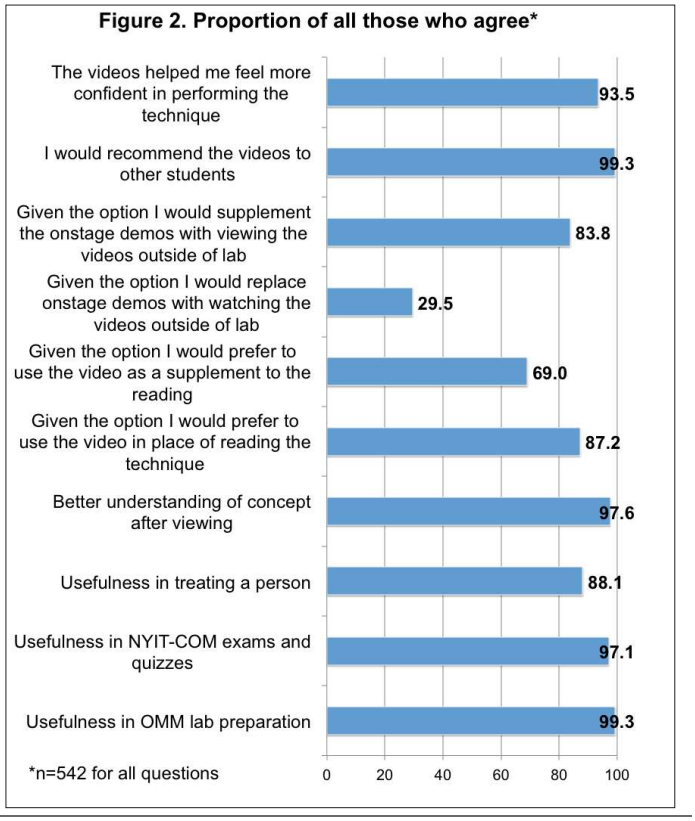
Students across all years used the OMM videos most frequently for OMM laboratory preparation and NYIT-COM exams and quizzes as seen in figure 1. Most students answered positively (agree or strongly agree) to selected questions as shown in figure 2 (n=542). The proportions were not different between gender groups or class year to all the questions except "Given the option I would prefer to use the video as a supplement to reading the technique." To this question, the data proportions were significantly different between the groups of clinical (class of 2013 and 2014) and the preclinical (class of 2015 and 2016) students. Comparison of proportions of preclinical and clinical students answering either agree or strongly agree to preferring "to use the video as a supplement to reading the technique" found that 78.1% of clinical students answered positively and 21.9% answered negatively or neutral, while 59.2% of preclinical students answered positively and 40.8% answered negatively or neutral (p-value <0.001, OR = 2.46, 95% CI (1.64, 3.69)). Comparison of students in their preclinical and clinical years found that the median number of different (unique) videos students view per week were 7 (range 0, 51) and 4 (range 0, 20) respectively (p-value <0.001). The median number of times students watch a video before they understand the technique or concept presented in the video was not significantly different between the groups.



Comments

Active learning can be achieved by several methods, including, but not limited to, problem-based learning, ability-based education and assessment-as-learning, cooperative learning, case-based learning, role-playing and student presentations.[4,5] Each of these methods allows students to work through problems in a self-directed manner as opposed to a teacher- or faculty-directed manner. While some approaches are more useful in larger groups, active learning can also be applied to the small group setting. For example, role-playing is a common active learning technique used in pharmacy schools where students take on either the role of a patient or pharmacist.[4,5] This is similar to OMM laboratory where one student is asked to be the patient while the other takes on the role of the doctor and proceeds to diagnosis and treat the "patient" using OMM techniques discussed in lab. With the use of the OMM videos prior to lab, it is possible to limit the onstage demonstrations and increase the active learning by role-playing or other small group learning methods.

Integrating technology, in the form of OMM videos, can increase active learning by clearly demonstrating OMM techniques prior to lab. This can then allow for decreased class time spent reviewing techniques, allowing for more hands-on practice time during lab. Incorporation of technology can also be expanded beyond the use of OMM videos before class. During labs, access to laptops and tablets may allow students to review anatomy and



clinical cases related to techniques being taught in lab. The use of OMM videos like those used at NYIT-COM can be utilized by students in their clinical years and are not limited to use by preclinical students. While the videos are utilized heavily for exam preparation, videos are available to all current students, allowing for students to review techniques in preparation for treating patients. The use of the videos as learning tools has been shown to increase students' grades in clinical skills training as well, making it important to provide third and fourth year OMS with access to OMM videos. Chiropractic students use methods similar to medical students in order to learn clinical skills, and it has been demonstrated that videos used to teach chiropractic students physical exam skills increase average scores versus students that do not utilize the videos.[7]

This study demonstrates that students across all class years preferred to utilize the OMM videos in both the laboratory and clinical settings. Students were also asked to indicate how many times they viewed the videos in a week to gauge frequency of usage of the videos. OMS agree or strongly agree that the videos are useful in several situations and preferred the videos as a supplement to onstage demonstrations. Student responses also revealed that OMS would replace readings with the OMM videos, if given the option.

When structuring OMM laboratory time to maximize active learning, understanding student learning preferences plays an important role. However, further research is needed to determine optimal methods of learning OMM in order to encourage knowledge of and confidence with using OMT. Studies in the future will look at the influence of OMM videos on student grades by looking at incoming OMS with little or limited knowledge of OMT. OMS should be given learning tools that they deem useful for improving their osteopathic education in both preclinical and clinical years. OMM videos for clinical students may also be geared towards emphasizing what techniques are useful based on disease states such as asthma, post-operative ileus, etc. It would also be helpful to evaluate OMM laboratory grades in future studies to quantify the usefulness of the OMM videos, similar to Romanov and Nevgi.[6]

Conclusion

Through this study, students indicated that OMM videos used at NYIT-COM were preferred in both the preclinical and clinical years. OMS felt more confident in performing multiple techniques, found the videos useful when treating persons (patients, friends, and family) and preferred to utilize the videos as a supplement to on-stage demonstrations. This study suggests that other osteopathic

schools may wish to further investigate the value of including OMM videos in their curricula.

Acknowledgements

We would like to express our gratitude to all those who made this study. Special thanks to the Department of Osteopathic Manipulative Medicine, NYIT-COM, Old Westbury, NY; and the ATG group at NYIT-COM, especially Elizabeth Doran, Stacy O'Connor, and their team.

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Appendix A – OMM Video Usefulness Study Survey

These questions refer to the OMM instructional videos available through the NYIT-COM website **only**. This does **not** include the lecture videos or videos in preparation for lecture. Answer the following questions as accurately and honestly as possible. Do not leave any questions blank.

1. Gender
   - o Male
   - o Female
2. What is your graduation year?
   - o Class of 2013
   - o Class of 2013 Academic Scholar
   - o Class of 2014
   - o Class of 2014 Academic Scholar
   - o Class of 2015
   - o Class of 2016
3. Which of the following reasons have you used the videos for? Check all that apply.
   - o Preparing for OMM lab
   - o Preparing for NYIT-COM exams and quizzes
   - o Preparing for a board exams
   - o Preparing to treat a person (includes patient, family member and friend)
   - o Other (Be specific)
   - o Have never used videos
4. The videos were useful in understanding how to perform the technique in preparation for OMM lab.
   - o Strongly disagree
   - o Disagree
   - o Neutral
   - o Agree
   - o Strongly agree
   - o Not applicable
5. The videos were useful in understanding how to perform the technique in preparation for NYIT-COM exams and quizzes.
   - o Strongly disagree
   - o Disagree
   - o Neutral
   - o Agree
   - o Strongly agree
   - o Not applicable
6. The videos were useful in understanding how to perform the technique in preparation for board exams.
   - o Strongly disagree
   - o Disagree
   - o Neutral
   - o Agree
   - o Strongly agree
   - o Not applicable
7. The videos were useful in understanding how to perform the technique in preparation for treating a person (includes patient, family member and friend).
   - o Strongly disagree
   - o Disagree
   - o Neutral
   - o Agree
   - o Strongly agree
   - o Not applicable
8. I better understand the technique or concept after viewing the video.
   - o Strongly disagree
   - o Disagree
   - o Neutral
   - o Agree
   - o Strongly agree
   - o Not applicable

9. How many videos do you view per week?
_____Enter a number:
10. How many times do you watch a video before you understand the technique or concept presented in the video? (Count any time you rewind the video as an additional viewing of the video.)
_____Enter a number:
11. If given the option to learn a new OMM technique I would prefer to view the video in place of reading the technique.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

12. If given the option to learn a new OMM technique, I would prefer to use the video as a supplement to reading the technique.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

13. If given the option to learn a new OMM technique, I would choose to replace the onstage demonstrations with watching the videos outside of class in order to allow for more active learning in small lab groups (pods).
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

14. If given the option to learn a new OMM technique, I would continue to supplement the onstage demonstrations with watching the videos outside of class.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

15. I would recommend the use of the videos to other students.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree
- o Not applicable

16. The techniques were well demonstrated on the videos.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree
- o Not applicable

17. The videos helped me feel more confident in performing the technique.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree
- o Not applicable

18. I am likely to use OMM in my future practice.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

19. I am likely to utilize the OMM videos after I graduate NYIT-COM if they are made available to me.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

20. I would use the videos if made available as a smartphone app.
- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

Appendix B – Initial email with survey link

Subject: 10-minute OMM video usefulness survey

Dear NYIT-COM student,

The OMM department is conducting a survey regarding the usefulness of the OMM videos provided to you by NYIT-COM. Your responses are important in understanding the usefulness of the OMM videos and will influence the OMM curriculum. Please follow the link below to complete this 10-minute survey. You will have one week to complete the survey before it is closed.

<Link to Survey to be inserted here>

If you have any technical difficulties with the survey, please contact Dr. Sheldon Yao at syao@nyit.edu.

Thank you for your participation.

Sincerely,

Melissa K. Meghpara, OMS III
Academic Scholar
New York Institute of Technology College of Osteopathic Medicine Class of 2015

Appendix C – Reminder email with survey link

Subject: Reminder that there are only 2 days left to complete this survey

Dear NYIT-COM student,

This is a reminder that there are only 2 days left to complete this survey. The OMM department is conducting a survey regarding the usefulness of the OMM videos provided to you by NYIT-COM. Your responses are important in understanding the usefulness of the OMM videos and will influence the OMM curriculum. Please follow the link below to complete this 10-minute survey. You will have one week to complete the survey before it is closed.

<Link to Survey to be inserted here>

If you have any technical difficulties with the survey, please contact Dr. Sheldon Yao at syao@nyit.edu.

Thank you for your participation.

Sincerely,

Melissa K. Meghpara, OMS III
Academic Scholar
New York Institute of Technology College of Osteopathic Medicine Class of 2015

Appendix D – In lab reminder to first and second year students

This is a quick reminder that if you have not yet done so, please complete the OMM Video Usefulness Survey which you were sent earlier this week. Please take 10-minutes to fill out the survey in order to help us learn how useful the OMM videos are to you and how we can change the OMM curriculum. Thank you.

Osteopathic Management of a Family with Inherited Cervical Dystonia

Jayme D. Mancini, DO, Ph.D, FAWM and Denise K. Burns, DO, FAAO

Abstract

Introduction

Cervical dystonia is a primary torsional dystonia type of movement disorder involving the sternocleidomastoid, trapezius and other cervical muscles with initial symptoms of pulling, pain, or stiffness of the neck and associated head tilt that can have intermittent exacerbations and progress to disability. Osteopathic manipulative medicine (OMM) has previously been used to significantly improve biomechanical functioning amongst people with the movement disorder Parkinson's disease, and it may have long-term benefits in people with dystonia as well.

Case report

A family including a 32-year-old mother (TR), a 4-year-old daughter (AR), and a 21-month-old son (MR), were diagnosed with spasmodic torticollis or cervical dystonia. The somatic dysfunctions of each subject were diagnosed and treated with osteopathic manipulation.

Conclusion

The subjects had similar somatic dysfunctions in the cranial and cervical regions with similar effects of the long cervical muscle spasms on the shoulder girdle and upper thoracics. The youngest, MR, had the simplest side-bending and rotation pattern with the majority of his body being mildly to moderately side-bent left and rotated right. AR had rotations to the left in her lumbar spine and pelvic girdle. TR's somatic dysfunction pattern was more complicated, having multiple changes in the direction of side-bending and rotation. The differences amongst their exams may be a result of growth and development with age, including compensatory biomechanics, as well as variability in stress or falls. Balanced ligamentous tension, ligamentous articular strain, modified muscle energy, articulatory and high-velocity low-amplitude pulse techniques were used, resulting in increased range of motion and, in TR, a 30-40% decrease in stiffness and pain.

Introduction

As medicine and science progress, the benefits of an integrative approach to neurological disorders are becoming clearer. Dystonia includes a broad spectrum of central nervous system disorders, not all of which appear to be inheritable. Dystonia is defined as sustained muscle contraction, usually causing twisting movements or abnormal postures. Primary torsional dystonia (PTD) is idiopathic or genetic in nature. It includes a broad clinical spectrum from childhood-onset generalized dystonia to adult-onset focal dystonia. Focal dystonia and those primarily affecting one to two spinal segments usually involve the craniocervical muscles or arms and can become

American Osteopathic Association Continuing Medical Education

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Authors: Melissa K. Meghpara, OMS III; Michael J. Terzella, DO; Theodore B. Flaum, DO; Min-Kyung Jung, PhD; Sheldon C. Yao, DO

Publication: *AAO J*, Volume 23, No. 3, Sept. 2013, pp. 24-30

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June 2013 *AAO Journal* CME quiz answers:

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

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

Mail this page to:
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1. In the article on the usefulness of video learning, the authors refer to Mann and Eland's article about video learning as being useful in which OMM technique?
   a. Balanced Ligamentous Tension
   b. Facilitated Positional release
   c. HVLA
   d. LVLA
   e. Spencer

2. A higher percentage of clinical medical students preferred video learning as a supplement to reading the technique than preclinical medical students in the student survey.
   a. True
   b. False

3. Which of the following was not mentioned by students as a reason to watch OMM videos?
   a. Preparing for OMM Lab
   b. Preparing for board exams
   c. Preparing to read a textbook
   d. Preparing to treat patients
   e. Preparing for NYIT-COM exams and quizzes

4. Which of the following is an example of active learning?
   a. Listening to lectures
   b. Reading textbooks
   c. Problem-based learning
   d. Solo studying
   e. Watching a demonstration

segmental. Segmental conditions are those in which two or more contiguous regions are affected.[1]

Cervical dystonia is a focal PTD involving the sternocleidomastoid, trapezius and other cervical muscles with initial symptoms of pulling, pain or stiffness of the neck and associated head tilt. The degrees of head tilt vary, and tilt can occur in any one of four directions: rotational torticollis, retro-, antero- or laterocollis. The scale for Activities of Daily Living (ADL) ranges from *pain caused by muscle spasm* to *employment disability* to *completely dependent*, such as in childhood-onset generalized dystonia or adult-onset fully dependent type. Cervical dystonia has such a significant impact on more than the neck region that a uniform subjective reporting questionnaire has been developed by Cano.[2] The questionnaire evaluates head and neck symptoms, pain and discomfort, upper limb activities, walking, sleep, annoyance, mood and psychosocial functioning.

Epidemiology

Spasmodic torticollis is one of the most common forms of dystonia seen in neurology clinics, occurring in approximately 0.390% of the United States population in 2007 (390 per 100,000).[3] Worldwide, it has been reported that the prevalence rate is 57 per 1 million.[4] The exact prevalence of the disorder is not known; several family and population studies show that as many as 25% of cervical dystonia patients have relatives that are undiagnosed,[5,6] and many patients are diagnosed well after a year of seeking medical attention.[7,9] Spontaneous remission occurs in less than 20% and most relapse. There is not always a significant sign, such as seen in the other focal phenotypes, to alert physicians that the primary cause is a central nervous system disorder. Cervical dystonia is likely underdiagnosed and/or diagnosed after permanent damage to joints and soft tissue has occurred.[7] Other types of focal PTD include blepharospasm, oromandibular, laryngeal and writer's cramp.

Etiology

There have been more than 30 gene loci discovered to be associated with specific dystonia phenotypes. There are eight focal or segmental PTD phenotypes. There have been gene loci found for six of the eight phenotypes, four of these are focal or segmental involving the head and/or neck and not starting with blepharospasm (phenotypes DYT6, DYT7, DYT13, DYT17).

Mutations causing dystonia can be sporadic or inherited. The exact mutation can vary greatly amongst affected people at the same gene loci.[7] The genetics of dystonia are further complicated by an incomplete penetrance of what appear to be autosomal dominant alleles. There have been few familial studies on cervical dystonia; the majority of affected families evaluated were in Europe and Brazil. Understanding the genetics and circuitry changes in dystonia can aid to understanding and developing improved treatment options for patients, including earlier diagnosis.

A critical problem in studying focal and segmental PTD is understanding the pathophysiology. Isolated anatomical structures and individual neurotransmitter studies have not revealed conclusive or reproducible etiologies. The most promising studies have investigated neural fiber tracts or the circuitry connecting the areas of the CNS involved in movement. This may help determine at which level of biomechanics a disruption occurs and where the condition could be treated. Several studies show that dystonia is a disturbance of central processing of sensorimotor feedback, a combination of nature and nurture disrupting the connections of motor processing.

Central neurotransmission abnormalities are more likely a compensatory result of the illness. While there are brain dopamine abnormalities observed amongst diverse phenotypes of dystonia, the exact pathway appears different amongst the identified phenotypes and genotypes. Some PTD types demonstrate improvement, at least temporarily, with dopaminergic perturbation by pharmaceutical agents (DRD), while some do not. Dopamine-responsive dystonias are associated with mutations in genes involved in dopamine synthesis. The most common form of dopamine-responsive dystonia has a mutation that ultimately leads to nigrostriatal dopamine concentrations of less than 20% of normal values.[1] Reduced dopaminergic (D2) synaptic activity in striatum, likely involving a paucity of D2 receptors or D2 receptor binding, has been demonstrated in DYT1 and a number of idiopathic dystonias, including blepharospasm, rotational torticollis and cervical dystonia.[1] Normally, presynaptic D2 receptors modulate dopamine release, and reuptake and postsynaptic D2 receptors modulate striatal GABA release. Related to this aspect of dystonia pathophysiology are studies demonstrating that biofeedback-based sensorimotor training significantly increased striatal D2 binding in individuals suffering from focal hand dystonia as determined by PET scan. However, pharmaceutical agents to perturb dopamine signaling have not provided significant relief for patients with dystonia.[1] Thus, the dopamine abnormalities may be a neural circuitry compensation for the underlying etiology. Several studies have also reported involvement of mitochondrial complexes, GABAergic pathway alterations, and calcium regulation changes in various types of dystonia, but, again, these do not seem to reveal the underlying causative mechanism.

Cerebellar perfusion and cerebello-thalamocortical fiber circuitry changes during structural imaging studies have also been found in primary dystonias. Changes in gray matter density within the cerebellum were seen in idiopathic cervical dystonia human subjects, benign essential blepharospasm and focal hand dystonia. Hyperperfusion of the cerebellum suggesting functional anomalies of the cerebellum have been demonstrated in exercise-induced paroxysmal dystonia, generalized dystonia, and focal hand dystonia.[1] Additionally, anomalies were found in the integrity of the cerebello-thalamocortical tracts of human subjects, manifesting and non-manifesting carriers of DYT1 and DYT6, suggesting an endophenotype with known genetic component. The non-manifesting carriers demonstrated an additional area of fiber disruption which may represent a compensatory mechanism. Again, it is not clear if these cerebellar changes are more a cause or an effect of the dystonia. There is mounting evidence suggesting aberrant motor learning or excessive neuroplasticity of the motor system in this disorder.[1,8] Understanding how this occurs may help us understand why 60-70% of genetic carriers are functionally asymptomatic or only have subclinical motor abnormalities.[7]

In addition to central processing of sensorimotor feedback, there have been studies of the peripheral circuitry. The central nervous system must process visual, vestibular, tactile and proprioceptive input. In a multimodal mathematical reflex model of the human wrist, including voluntary input from supraspinal structures and input from proprioceptive reflex pathways (velocity, position and force) representing the Ia, II, and IIb afferents, perturbation of individual afferents was used to assess the final external torque acting on the limb. The results showed that an imbalanced reflex sensitivity with unstable force feedback via Type Ib golgi tendon afferents in one of the antagonists closely resembled all features of dystonia in complex regional pain syndrome.[10]

Treatment strategies

The standard therapy for dystonia is intramuscular injection of botulinum toxin, which decreases the abnormally increased frequency of motor evoked potentials on EMG and restores reciprocal inhibition. Despite the therapeutic effectiveness of the botulinum toxin, the benefits wax and wane over the three month interval of treatment. Sensorimotor "tricks" or *geste antagonistique* exercises, which involve touching the affected body part or adjacent parts, reduce the aberrant muscle contractions in cervical dystonia. The effects were measurable in muscle recruitment as determined by EMG, as well as by reduced activation of the supplementary motor area and primary sensorimotor cortex.[1] Acupuncture has also been used as a complementary therapy.[7] In this case report, we present another treatment modality, osteopathic manipulative medicine.

The Osteopathic approach to treating cervical and other types of dystonia is advantageous. Although movement disorders are a challenge for all physicians, osteopathic evaluation of the neuromusculoskeletal systems can better identify key areas to treat with manual medicine, injections,

Osteopathic Approach to Common ENT Complaints of Children

March 17–18, 2014 at The Broadmoor in Colorado Springs, CO

Course Description
This course is designed for participants with intermediate to advanced skills in OMM and those who have taken intermediate level Cranial courses. We will take an in-depth look at the anatomical and structural influences of the pediatric ENT patient, taking a close look at the cranial and facial anatomy and its influences on health and function of the middle ear, sinuses, and temporomandibular joint.

CME
16 hours of AOA Category 1-A credit are anticipated.

Course Times
Monday and Tuesday: **8:00 am - 5:30 pm**
Breakfast and lunch on your own, coffee provided.

Course Location
The Broadmoor
1 Lake Avenue, Colorado Springs, CO 80906
Reservations: 7am to 9pm (MT), seven days a week.
(888) 974-3088 *(Mention AAO event.)*
https://resweb.passkey.com/go/aao14

Travel Arrangements
Contact Tina Callahan of Globally Yours Travel at (800) 274-5975 or globallyyourstravel@cox.net.

Heather P. Ferrill, DO, Program Chair

Dr. Ferrill, a 2000 Michigan State University College of Osteopathic Medicine graduate, is an Associate Professor of Osteopathic Manipulative Medicine (OMM) at the Rocky Vista University College of Osteopathic Medicine (RVUCOM). Board-certified in Family Practice and Neuromusculoskeletal Medicine/OMM, her practice emphasizes Osteopathic Manipulative Treatment in the pediatric population. She serves on the AAO Board of Governors and the Education Committee.

Registration Form

Osteopathic Approach to Common ENT Complaints in Children
March 17–18, 2014, 8:00 am–5:30 pm

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stretching and/or therapeutic exercise to address cranial nerve irritation, headaches, range of motion, alignment, ease of breathing, somatovisceral complaints and gait. Biomechanical benefits of osteopathic manipulative medicine for treating people with Parkinson's disease has been demonstrated, and there is an established protocol.[11] Assessment of the benefits amongst people with dystonia may be useful in preventing degenerative joint disease and disability. Also, the holistic nature of the osteopathic approach may identify specific behavioral modifications helpful in managing triggers for exacerbations or conducting ADLs. The following case report describes an inherited spasmodic torticollis and an osteopathic approach to care.

Case Report

Chief complaint

TR is a 32-year-old female presenting to our outpatient office for mild right-sided neck and shoulder stiffness for four years with intermittent painful exacerbations associated with right-sided head tilt. The exacerbations appear to be brought on by significant life stress or emotional distress two to four times per year, with the first episode occurring with the birth of her first child when TR was 28 years old. TR noted that when she looks back to her baby and childhood photographs, her head was always tilted to the right less than approximately 30 degrees. Previous exacerbations were associated with severe pain, insomnia due to pain, increased head tilt, decreased ability to dress herself and decreased ability to care for her children. These episodes were improved by flexeril qHS PRN muscle spasms and ibuprofen 800mg tid PRN pain prescribed by the emergency department. TR also complains of minor low back stiffness and intermittent pain that she feels makes her gait less smooth.

TR has two children; AR is a four-year-old female born with left-sided torticollis. TR denies any complications during gestation or at birth. After birth, AR had fifteen months of physical therapy for torticollis. TR's second child, MR, is a 21-month-old male born via elective cesarean section without complications. He was diagnosed with left-sided torticollis at four months old, and he received 10 months of physical therapy for torticollis.

TR noted that the torticollis improved in both children during physical therapy, but that both children do still have a slight decrease in neck range of motion in turning left and side-bending to the right, as well as asymmetrical eyesockets. The left eyesocket is deeper than the right. Both AR and MR have had otherwise normal age-appropriate development. TR denies any difficulty swallowing or frequent coughing when eating or drinking amongst them, but she states that her children have always preferred hard or crunchy food and avoid soft foods. Neither child complained of pain or headache.

Past medical history

TR had mild intermittent childhood asthma not requiring medication, but she does keep an albuterol inhaler for respiratory emergency. TR has also had a failed tubular pregnancy. She denies any trauma. TR has allergies to penicillin and sulfa-containing drugs. Past medical history, allergies and medications were otherwise negative for AR and MR.

Family history

TR's mother is 60 years old with "back problems" and GERD. Father is 63 years old and healthy.

Social history

The presented family was living with TR's husband at her mother and step-father's house while her house was being built. TR has alcohol socially on weekends. TR denies tobacco, marijuana, or illicit drug use.

Review of symptoms

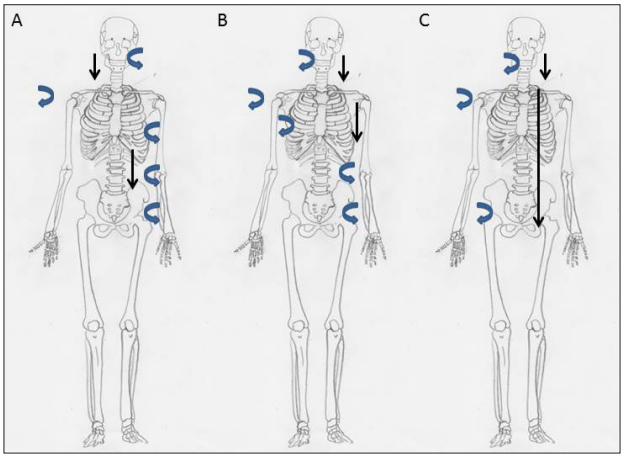
When TR has exacerbations of her condition, she experiences constant pulling pain with sharp pains upon moving her head or neck. The pain radiates into her right fifth finger. She has numbness and other paresthesias on the right face from the periorbital area to her jaw. The headaches are sharp pains in the right suboccipital area. She also reports right-sided constant stiffness in her upper back and shoulder and mild pain that worsen with exacerbations. TR denied depression, anxiety, and finds herself generally in a good mood.

AR, herself, had no complaints, nor did her mother. AR had no developmental delays or concerns for delay. TR had no other complaints for MR. While he did not have any developmental delays, he could say approximately 10 words understandable by his parents. He was not putting two words together. His language comprehension was normal. Per mother, both children have age-appropriate play, affect, mood, interests and social skills.

Physical exam

TR's vital signs were within normal limits on all seven encounters. Her initial physical exam was as follows. Her head exam was significant for left-sided sphenobasilar torsion and side-bending, right maxillary restriction, left frontosphenoidal restriction, depressed right eye socket, right intraosseous occipital strain, right occipital-axis compression, right tentorial cerebelli strain and change in sensation over right trigeminal nerve distribution. The right temporal bone was internally rotated. She had tenderness to palpation of the right suboccipital area. Neck exam was significant for muscle spasms in the right sternocleidomastoid, scalenes, levator scapulae and upper

trapezius. The neck was side-bending to the right with chin mildly deviated left of the sternal notch. C2 was flexed, side-bent right, rotated right with axis-atlantis motion rotated left. C6 extended, rotated and side-bent right. Chest exam was significant for bilateral, diffuse, shallow respirations. She had elevated right first rib, inhalation dysfunction in right ribs one and two, right clavicular abduction dysfunction, T1 neutral rotated, side-bent right, T3-7 extended side-bent right, rotated left. Ribs 3-6 had



Depiction of sidebending (straight arrows) and rotation (curved arrows) of axial skeleton in a family of mother (A), daughter (B), and son (C) with cervical dystonia. There were more changes in the direction of rotation from head to pelvis in the mother than her children. Alternation of rotation in the axial skeleton may increase with age in subjects with cervical dystonia. (Drawing by Tara Mancini)

inhalation dysfunction right more than left. She had a persistently protracted left scapula. Bilateral pectoralis muscle spasms were also present. Lumbar exam was significant for L2 neutral rotated left, bilateral quadratus lumborum and iliopsoas spasms with positive Thomas tests. Pelvic girdle was significant for left superior innominate and pubic shear and sacral left-on-left dysfunction. Her extremities had hypermobile range of motion in elbows, knees, PIPs, and hip joints. She had bilateral posterior fibular head dysfunction and right inferior cuboid dysfunction.

AR was very active without focal deficits. She was content or happy and in no distress. AR's head exam was significant for right-sided sphenobasilar torsion and side-bending strains, along with a right-sided lateral strain, left temporal internal rotation, left tentorial cerebelli strain, and left occipital-axis compression with a left occipital intraosseous strain. AR had a depressed left eye socket. CN 2-12 were intact. She had tenderness to palpation in the left suboccipital area. Neck exam was significant for cervical flexion from the occipital-axis to C3 right rotation and left side-bending. Left sternocleidomastoid spasm was present with decreased range of motion in turning her head left. Chest/thorax exam was significant for extension right rotation with left side-bending. AR had left superior first rib with inhalation dysfunction in left ribs 1-3 and an exhaled left rib 7. Her respiratory diaphragm was flattened bilaterally. She had decreased lumbar lordosis with rotation to the left. Her left innominate was flared outwards.

MR was very active without focal deficits. He was content to happy and in no distress. MR's head exam was significant for mild plagiocephaly, right lateral strain, right-sided sphenobasilar side-bending, right occipital-mastoid restriction, left occipital-axis compression with occipital-mastoid restriction. Left maxillary restriction. Depressed left eye socket and his left eyelid did not appear to open as much as his right. He refused testing eyelid strength. Neck exam was significant for decreased head turning range of motion to the left and he had mild spasms in his left sternocleidomastoid and scalene muscles. His shoulder girdle was rotated right. MR's cervical, thoracic and lumbar vertebrae were side-bent left. He had bilateral respiratory diaphragm flattening. His pelvis was rotated right and a left anterior innominate rotation was present (see figure 1).

The family returned for treatment weekly for four weeks. TR noted improvement in her low back pain and shoulder pain, as well as less stiffness in her neck. Her physical exam had improvement in pelvic floor balance, no recurrence of the innominate shear, improving Thomas tests bilaterally, frontosphenoidal and maxillary restrictions, rib dysfunction. In AR and MR improvement in range of motion and alignment of shoulder girdle, thorax, diaphragms, lumbar vertebrae, pelvis, and sacrum were found. AR had less tenderness in her craniocervical region after the second treatment. With encouragement, MR was pronouncing words more clearly and using two-word sentences. Both children enjoyed singing and dancing. MR's enunciation and pronunciation when singing improved over the treatment period.

Subsequently, TR returned with a severe exacerbation of her symptoms associated with the death of her step-father. Her symptoms improved by 30-40% with OMM treatment; however, the treatment wore off over one to two days. She had been prescribed flexeril 10 mg qHS prn for muscle spasms, which helped her sleep with less pain, but her muscle spasms gradually returned in the morning. TR returned every three to four days for two more treatments. TR was also referred to a movement disorders neurologist, but she had not been evaluated during the treatment period.

Conclusions

This family's condition was diagnosed as inherited spasmodic torticollis, also recognized as cervical dystonia. It may be a result of a mutation in THAP1 gene, which may be autosomal dominant with variable penetrance.

Somatic dysfunction comparison

There were many similarities amongst the three subjects' physical exams, primarily in the cranial and cervical regions with similar effects of the long cervical muscle spasms on the shoulder girdle and upper thoracics (assuming that TR's presentation is on the opposite side as her children's). The youngest, MR, had the simplest side-bending and rotation pattern with the majority of his body being mildly to moderately side-bent left and rotated right. Next, AR, was side-bent left, rotated right in her upper body, but was more rotated left in her lower body. There is no way of knowing if she had lower body dysfunction patterns like her brother when she was 21 months. Finally, TR's somatic dysfunction pattern was more complicated with multiple changes in the direction of side-bending and rotation. The differences amongst their exams may be a result of growth and development with age, including compensatory biomechanics as well as variability in stress or falls. The significance of the difference in the amount of time that each child had physical therapy remains unknown.

Types of OMM Technique

All three subjects responded well to treatment. Treating the tentorium cerebelli, including the sphenobasilar synchondrosis, the temporal bones, C2 and the thoracic inlet improved overall symptoms. Cranial and oculocephalogyric muscle energy techniques were used effectively to relieve occipital-atlantis compression. Additionally, a strain extending from the craniocervical junction to the T4-6, where there was extension with severe rotation affecting the comfort and ease of both breathing and scapulothoracic motion, was also found to be important to treat. Reciprocal inhibition and balanced ligamentous tension were used. Muscle energy technique either with low force and prolonged isometric contraction or reciprocal inhibition improved the range of motion in the axial thoracics and lumbars and in the pectoralis muscles bilaterally. Articulatory technique was used to treat the sacrum and pelvis in both children. Thoracic HVLA was used to treat AR, and it was well tolerated. TR was prescribed neck and shoulder stretches, from which she found minimal improvement. We conclude that OMM improved the pain and symptoms in a case of inherited cervical dystonia.

Discussion

Further management could include botulinum toxin injections for exacerbations, physical therapy and development of a clear exercise prescription. The combination of osteopathic manipulative medicine with the standard treatment of botulinum toxin injections intramuscularly may be particularly beneficial, as the botulinum toxin can decrease the main torque induction in the cervical region allowing the OMM to better relieve the rest of the body. Additionally, the patient can utilize OMM and potentially certain exercises to make the transitions from botulinum toxin injections to the wearing off of the botulinum toxin. Future research could investigate and evaluate outcomes among people with hereditary dystonia treated osteopathically. Limitations of the study include a treatment period of only five weeks, TR's parents were not evaluated and genetic testing was not done.

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An Introduction to the Fascial Distortion Model (FDM)

March 17–18, 2014 at The BroADmoor in Colorado Springs, CO

Course Description
An additional model used in the diagnosis and treatment of musculoskeletal pain. This course will cover the ankle, shoulder, and knee. FDM is a model of thinking that provides a framework to view the function of the body and the expression of pain. Fascia can be viewed as the "wrapper" of our bones, muscles, and organs. Fascia is an integral part of the body's nerve network. Dr. Still identified the importance of the fascial system when seeking health. Treatments in the FDM are directed at the fascia and restoring its function by focusing on correcting distortions in the fascial system and thereby eliminating pain. The FDM provides practitioners another model in which to view the body and another tool in the battle against musculoskeletal pain. FDM expands the capability of traditional Osteopathic modalities by specifically addressing the fascia and the distortions which are identified. Treatment of the fascial distortions can provide dramatic results by addressing the Biotensegrity of the body. The FDM is driven by a patient's body language, verbal description, and the provider's underlying understanding of the fascial distortions and their impact on the whole system.

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Todd Capistrant, DO, MHA, Program Chair

Dr. Capistrant is a board-certified Family Medicine physician specializing in Osteopathic Manipulation. He has been with Tanana Valley Clinic in Fairbanks, AK, since 2006, where he first began attending to patients in their 1st Care Center. In June 2013 he was selected as the Medical Director of Tanana Valley Clinic and oversees the thirteen different departments that comprise the clinic. Dr. Capistrant received a B.S. in Biology from the University of Minnesota and a D.O. at Des Moines University in Iowa. In addition to his medical education, Dr. Capistrant received a master's degree in Healthcare Administration from Des Moines University in Iowa. He is one of three physicians in the U.S. certified to teach seminars on the FDM model.

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Associate Director: Eric J. Dolgin, DO
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Sutherland Cranial Teaching Foundation
Beyond the Basics: Additional Sutherland Procedures
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AZCOM, Glendale, AZ
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Phone: (509) 758-8090 Fax: (509) 758-6806
Email: **jcunningham4715@yahoo.com**
Web site: **www.sctf.com**

October 25-28, 2013
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MSUCOM, East Lansing, MI
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Phone: (517) 353-9714 Fax: (517) 432-9873
Email: **cme@com.msu.edu**
Web site: **http://www.com.msu.edu/CME/Manual_Medicine_Courses/Direct_Action.htm**

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