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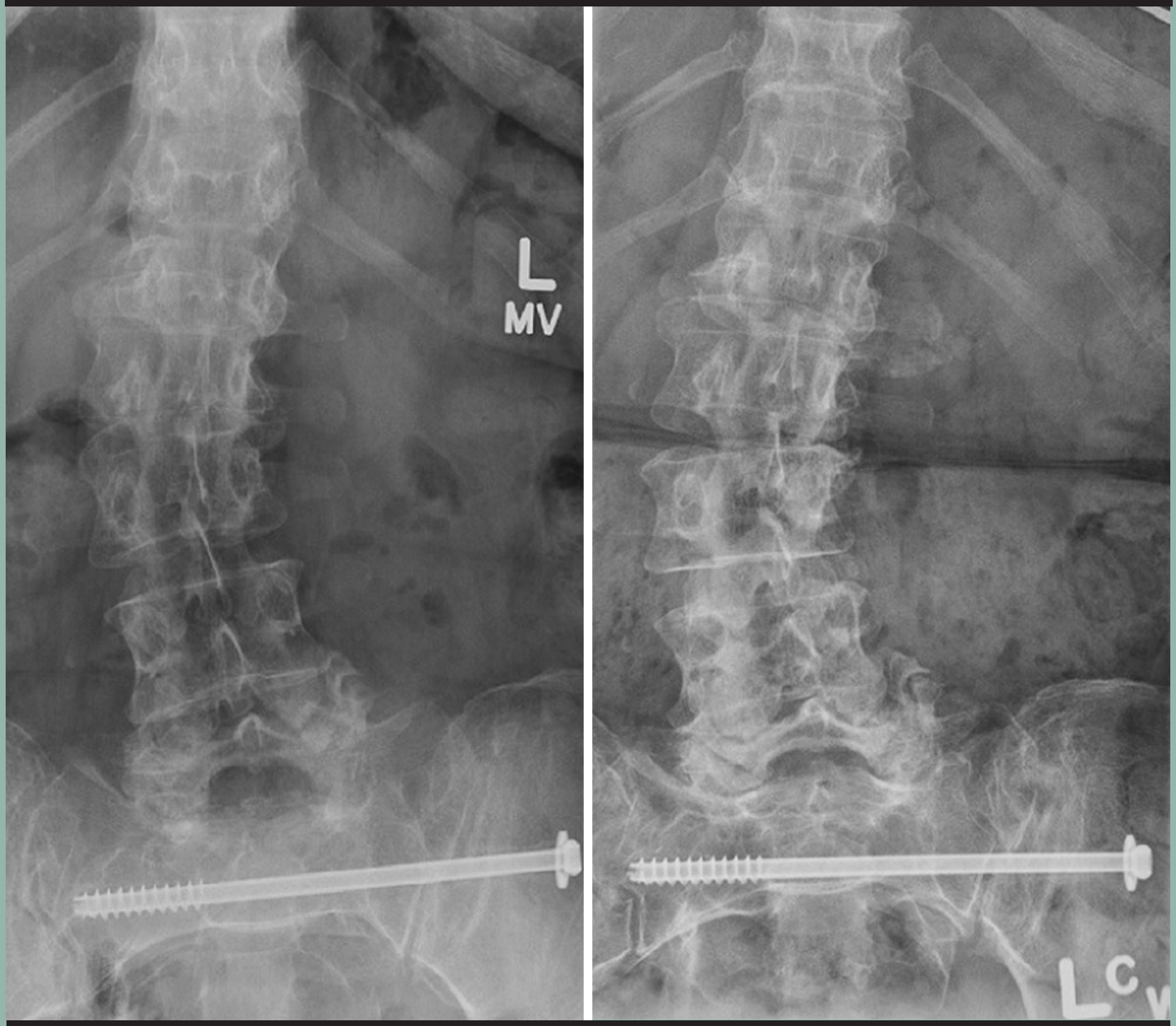


*Custom molded orthotics including a heel lift can level a patient's sacral base as demonstrated by the case study that starts on page 7. Orthotic treatment relieved the patient's pain after 7 years and allowed her to discontinue pain medication.*

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## EDITORIAL



## CASE REPORTS



## FROM THE ARCHIVES



## REGULAR FEATURES

# AAO Calendar of Events

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

## 2016

| | |
|---|---|
| June 15 | Committee on Fellowship in the AAO's teleconference—8:30 p.m. Eastern |
| June 16-19 | Introduction to Osteopathic Manipulative Medicine—Lisa Ann DeStefano, DO, course director—University of North Texas Health Science Center Texas College of Osteopathic Medicine in Fort Worth (This course is being supported in part by the AAO's Samuel V. Robuck Fund.) |
| July 4 | Independence Day—AAO office closed |
| July 18-25 | AOA annual business meeting—Chicago Marriott Downtown Magnificent Mile |
| July 24-25 | AAO Board of Trustees' meeting—Chicago Marriott Downtown Magnificent Mile |
| July 29-31 | Walking Toward Health: New Evaluations in Gait—Edward G. Stiles, DO, FAAO, and Charles A. Beck, DO, FAAO, course directors—Pyramid Three in Indianapolis |
| Aug. 5-6 | AAO Education Committee's meeting—AAO office in Indianapolis |
| Aug. 10 | Committee on Fellowship in the AAO's teleconference—8:30 p.m. Eastern |
| Sept. 5 | Labor Day—AAO office closed |
| Sept. 15 | AAO Board of Trustees' meeting—Anaheim, California |
| Sept. 16 | AAO Leadership Forum—Anaheim, California |
| Sept. 17-20 | AAO at OMED: Osteopathic Neuromusculoskeletal Medicine in the 21st Century—Daniel G. Williams, DO, program chair—Anaheim (California) Convention Center |
| Oct. 15 | Committee on Fellowship in the AAO's meeting—AAO office in Indianapolis |
| Oct. 21-23 | What's the Point? Multifaceted Clinical Approaches to Viscerosomatic Reflexes—Michael L. Kuchera, DO, FAAO, course director—Midwestern University/Arizona College of Osteopathic Medicine in Glendale |
| Dec. 1 | FAAO applications due |
| Dec. 2-4 | Fulford's Advanced Percussion Hammer—Richard W. Koss, DO, course director—University of North Texas Health Science Center Texas College of Osteopathic Medicine in Fort Worth |
| Dec. 2-4 | Cranial Approach of Beryl E. Arbuckle, DO—Kenneth J. Lossing, DO, course director—Midwestern University/Arizona College of Osteopathic Medicine in Glendale |
| Dec. 20 | Committee on Fellowship in the AAO's teleconference—8:30 p.m. Eastern |
| Jan. 11 | Committee on Fellowship in the AAO's teleconference—8:30 p.m. Eastern |
| Jan. 20-22 | Osteopathic Management of Chronic Pain: Addressing Chronic Fatigue Syndrome, Fibromyalgia, Multiple Sclerosis and Neuroinflammation—Bruno J. Chikly, MD, DO (France), course director—Midwestern University/Arizona College of Osteopathic Medicine in Glendale |
| Feb. 3-4 | AAO Education Committee's meeting—AAO office in Indianapolis |

# View From the Pyramids

*AAOJ* Scientific Editor Brian E. Kaufman, DO, FACOI, FACP

EDITORIAL

It is June, and summer is right at our doorstep. Here in Maine, we revel in those activities that the short few months of summer allow. My patients gravitate toward positivity. They have less pain, but often they still require treatments and medications.

Many patients with significant physiologic pain syndromes require ongoing support and treatments that enable them to have meaningful functional abilities, and this creates a substrate on which they live and often thrive. The foundations of pain management include everything from injections to osteopathic manipulative treatment (OMT) and pharmacological manipulation. A component of such management is analgesic medications, including opiates. Opiate use and misuse has been extremely well covered by the media recently but does not appear to be well understood.

This spring, the Centers for Disease Control and Prevention (CDC) released guidelines for primary care physicians prescribing opioids to manage chronic pain. The guidelines were released in response to the so dubbed "opiate crisis." The CDC writes that these guidelines are to "ensure patients have access to safer, more effective chronic pain treatment while reducing the number of people who misuse, abuse, or overdose from these drugs."[1] Unfortunately, instead of hitting it out of the park, they have struck out. In attempting to curtail opioid abuse, the CDC has created an environment that inspires many primary care providers to stop prescribing opioids completely while opening the door for insurance companies and legislatures to hold the remaining prescribers to the letter, and not to the spirit, of the recommendations. Although I am a pain management specialist, I am bound by the same constraints as the primary care physicians.

> **"The CDC has created an environment that inspires many primary care providers to stop prescribing opioids completely.**

To the untrained public, medicine is a simple matter of feeding test data into an algorithm that spits the answers to us physicians. Practicing doctors know that this is a misperception that overemphasizes gadgetry and belittles our contribution. With this mindset already firmly established, it is not hard to see that well intentioned guidelines can become misdirected. Already in Maine, legislation has been introduced to restrict opiate prescribing, and the Maine CDC has started to ask physicians to reduce patients' dosages or to switch to different opioids based on the national CDC guidelines. This simply blankets the population broadly and does nothing to address individual patient disease. My practice is primarily pain management, and while there has been a 50% increase in referrals, there also has been more than a 300% increase in paperwork in the last 2 months. This is a significant burden for a solo practitioner.

We osteopathic physicians know all too well that there are many potential problems with opiate misuse, dependence as well as all of the usual clinical issues. This increase in medication interference by both legislation and insurance payers will neither help our patients nor solve this opiate crisis. More than twice the amount of drugs of abuse used in Maine were obtained by friends or relatives and not physicians. This fact, coupled with the rise in heroin use, is evidence that physicians neither created nor are the solution to this problem.[2]

Pain management and primary care physicians are now going to have to make determinations on patient care based more on governmental edicts, along with the ever increasing medicine by insurance bureaucracy, while still being held to the standard of effective medical practice. And we still will be at risk for under-prescribing for pain, the so-called fifth vital sign that caused the opiate crisis, and for over charging, or even fraudulently billing. This is all while running the business of our practices and staying on top of the volumes of ever increasing paperwork required.

In summary, I make the following suggestions: 1) Doctors must get together and stop this madness. We must reclaim our profession and start driving the changes; 2) Osteopathic physicians, each and every one, must write the CDC and demand that OMT be inte-

*(continued on page 8)*

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For more information, email *AAOJ* Editor-in-Chief Brian E. Kaufman, DO, FACOI, FACP, at editoraaoj@gmail.com.

# Use of Orthotics to Treat Persistent Low Back Pain After Left Sacroiliac Joint Fixation: A Case Report

**James A. Lipton, DO, CSP-OMM, FAAO, FAAPMR, FAOCPMR, and 2LT Jochen A. Granja Vasquez, MS, MSC, USAR, OMS IV**

CASE REPORT

## Abstract

This is a report of a case in which a 55-year-old female underwent fixation surgery to stabilize her left sacroiliac joint (SIJ) after a motor vehicle accident in 2008. She complained of persistent low back pain (LBP) resistant to conservative care until 2015 when she visited the physical medicine and rehabilitation service at the Hampton VA Medical Center in Virginia.

The patient was diagnosed with an unleveled sacral base. She was treated with a 6 mm heel lift and with custom molded orthotics incorporating the lift, which leveled her sacral base.

Reduced patient-reported pain scores were documented, coinciding with sacral base leveling. To the authors' knowledge this is the first case reported involving the use of orthotics for leveling the sacral base after left SIJ fixation.

**Keywords:** low back pain, LBP, sacroiliac joint, SIJ, sacroiliac joint fixation, SIJF, sacrum, sacral base, heel lift, custom molded orthotics, CMOs

## Introduction

In the United States, low back pain (LBP) is a common complaint that is responsible for frequent physician visits, disability, missed days at work, and health care expenditure.[1,2] The differential diagnosis of LBP is extensive, which makes identifying an accurate diagnosis essential.[3–8] Sacral base dysfunction is an important but often underappreciated source of LBP.[9,10]

Using orthotics to correct sacral base unleveling in patients with LBP has proven beneficial.[11–15] Using orthotics in different patient populations has yielded statistically significant reductions of self-reported pain scores, correlating with sacral base leveling.[11–15]

The methodology behind lift selection also has been previously published.[11–19] The use of custom molded orthotics (CMO) as pre- and post-surgical devices has been proven beneficial with regard to the foot and ankle.[20]

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From the Hampton VA Medical Center in Virginia.

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The views in this article are those of the authors and do not reflect the official policy or position of the Department of the Army, the Department of Defense, or the United States Government.

### Continuing Medical Education Quiz

The purpose of the continuing medical education quiz—found on page 12—is to provide a convenient means of self-assessing your comprehension of the scientific content in the article "Use of Orthotics to Treat Persistent Low Back Pain After Sacroiliac Joint Fixation: A Case Report" by James A. Lipton, DO, CSP-OMM, FAAO, FAAPMR, FAOCPMR, and 2LT Jochen A. Granja Vasquez, MS, MSC, USAR, OMS IV.

Be sure to answer each question in the quiz. The correct answers will be published in the next issue of the *AAOJ*.

To apply for 2 credits of AOA Category 2-B continuing medical education, fill out the form on page 12 and submit it to the American Academy of Osteopathy. The AAO will note that you submitted the form and forward your results to the American Osteopathic Association's Division of Continuing Medical Education for documentation.

You must score a 75% or higher on the quiz to receive CME credit.

*(continued from page 7)*

This case report examines how orthotics benefited a patient who presented with sacral base unleveling and persistent LBP resistant to treatments tried by other providers following left sacroiliac joint fixation (SIJF).

## Case Report

### History

A 55-year-old female presented to the physical medicine and rehabilitation (PM&R) service at the Hampton VA Medical Center (VAMC) in Virginia with chronic back pain. She reported being a seat-belted passenger involved in a rollover motor vehicle accident 7 years previously. At that time, she was transported to the nearest trauma center for emergency surgery to address multiple life threatening injuries, including a ruptured spleen and a fractured pelvis (SIJF) and lumbar spine. In addition, she was treated for minor injuries. Sequelae from the trauma included a neurogenic bladder and difficulty walking.

After 2 years of rehabilitation, the patient ambulated with a cane, which was present at initial visit.

When the patient visited the VAMC, she complained of low back pain with occasional bilateral foot numbness occurring. The foot numbness occurred once or twice per week and lasted 30 to 45 minutes.

The patient reported a daily pain level ranging from 4 to 9 out of 10 on the verbal numerical rating scale. The pain in her lower back was constant and throbbing in nature. The patient also complained of muscle cramping in her lower legs.

Since the onset of her LBP, the patient had tried conservative care measures, including rest, heat, ice, a transcutaneous electrical stimulation unit, physical therapy, and yoga. In addition, the patient tried medical therapies such as nonsteroidal anti-inflammatory drugs, acetaminophen, gabapentin, muscle relaxants, opioids, and fluoroscopic guided injections, all of which failed to provide lasting relief of her LBP.

At the time of the initial visit, the patient was using the following medications to manage her LBP: 325 mg of acetaminophen with 5 mg of oxycodone twice a day as needed; 10 mg cyclobenzaprine hydrochloride nightly; 500 mg of methocarbamol nightly; and diclofenac topical gel as needed. She also was taking the following medications: 300 mg of gabapentin 4 times daily for neuropathic pain; 300 mg of quetiapine fumarate nightly to manage bipolar disorder; 5 mg of donepezil daily to manage dementia; 0.625 mg of conjugated estrogens and 2.5 mg of medroxyprogesterone (Prempro) daily for menopause; .05% clobetasol propionate ointment for psoriasis; 4 mg of tolterodine tartrate for overactive bladder; magnesium citrate and 5 mg of biscodyl for constipation; and 5-10 drops of carbamide peroxide 6.5% otic solution 4 times daily to manage wax buildup.

The patient reported having osteoarthritis, but she denied a history of cancer. The patient also expressed a strong desire to avoid surgery.

### Physical Examination

Visual gait analysis revealed the patient hyperpronated in stance phase. When the patient was palpated, she was found to have paraspinal tenderness of the low back, level anterior superior iliac spines (ASIS), asymmetrical sacral sulci (deep on right), and unlevel inferior lateral angles (superior on left) with a short left leg.

The patient had bilateral 5 out of 5 motor strength, 2 out of 4 deep tendon reflexes, and intact sensation to light touch and cold on the lower extremities. Bilateral straight leg raise (SLR) was negative.

Following examination, the patient was given a 6 mm heel lift to place in her left shoe. She was observed ambulating 1000 feet without incident. The sacral base was checked again, and it was found to be leveled (symmetrical sacral sulci and inferior lateral sacral angles).

*(continued on page 9)*

***View From the Pyramids***
***(continued from page 5)***

grated into the guidelines; and 3) The CDC should rename its guidelines: *The opiate guidelines: It's all your fault!*

## References


1. CDC guideline for prescribing opioids for chronic pain. Centers for Disease Control and Prevention website. http://www.cdc.gov/drugoverdose/prescribing/guideline.html. Updated March 16, 2016. Accessed May 24, 2016.
2. Opioids. Substance Abuse and Mental Health Services Administration website. http://www.samhsa.gov/atod/opioids. Updated February 23, 2016. Accessed May 24, 2016. ■

*(continued from page 8)*

Immediately after the heel lift placement, the patient stated, "I feel better." The plan was for the patient to wear her lift for 2 weeks and then be prescribed custom molded orthotics. The custom molded orthotics would have the unilateral heel lift built in as a unit to continue to address her leg length discrepancy and medial arching bilaterally to address her hyperpronation.


**Figure 1 (left).** *Anteriorposterior (AP) lumbosacral radiograph taken in 2013 after SIJF.*

**Figure 2 (below).** *Axial lumbosacral MRI at L5 taken in 2014 after SIJF.*

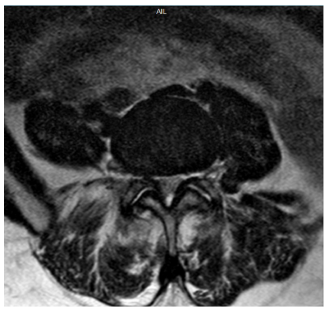
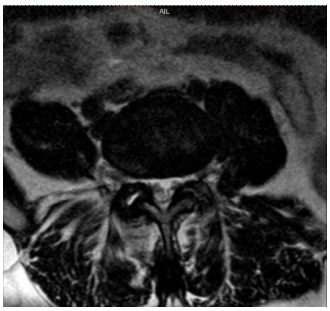


**Figure 3 (left).** *AP lumbosacral radiograph after 6-week lift treatment.*

**Figure 4 (below).** *Axial lumbosacral MRI at L5 after 6-week lift treatment.*



### Imaging

Medical records and the postoperative lumbosacral radiographs supported the patient's reported history. The images revealed degenerative joint disease in the lumbar spine, dextroscoliosis, mild neuroforaminal narrowing, and a horizontal transiliosacral screw fixation through the left SIJ. There was no evidence to suggest complications resulting from SIJF or red flags. *(See Figure 1.)*

Postoperative lumbosacral magnetic resonance images (MRI) revealed multilevel degenerative findings and dextroscoliosis. Level L4-L5 was consistent with broad-based disc protrusion, facet joint arthropathy, and ligamentum flavum hypertrophy causing moderate spinal canal narrowing and right neuroforaminal narrowing. *(See Figure 2.)*

### Follow-up Visits

Two weeks after the patient's initial visit to the PM&R service, she reported the 6 mm heel lift had reduced her pain to 0 out of 10, and she felt her body to be more balanced. Exam confirmed leveling of the sacral base (symmetrical depth of her sacral sulci and level inferior lateral angles) along with the maintenance of the pretreatment level nature of her anterior superior iliac spines.

At a second follow-up visit 7 weeks and 6 days after the initial treatment and implementation of orthotics, the patient returned to have her sacral base evaluated, to report current pain scores, and to update imaging, including lumbosacral radiographs and MRI. *(See Figures 3 and 4.)* At this final visit, the patient reported 0 out of 10 pain, coinciding with a palpably leveled sacral base *(see Table)*. The patient noted the cramping in her legs had completely subsided. At the last visit, she also reported that she had slowly weaned herself off of prescribed opioids, gabapentin, and muscle relaxants.

*(continued on page 10)*

**Table.** *Examination and Treatment Summary.*

| | Initial visit (before orthotics) | 2-week follow-up (with orthotics) | 7 weeks, 6 days follow-up (with orthotics) |
|---|---|---|---|
| **ASIS** | symmetric | symmetric | symmetric |
| **Sacral base** | asymmetric* | symmetric | symmetric |
| **Leg length** | short left leg | short left leg | short left leg |
| **Self-reported pain score** | 4-9/10 | 0/10 | 0/10 |

* right sacral sulcus deep, left inferior lateral angle superior

During a telephone follow-up with the patient at 11 weeks and 27 days, the patient confirmed she was still not experiencing any pain with her orthotics in place.

## Discussion

Sacroiliac joint arthrodesis was first described in medical literature as early as the 1920s.[21–24] Sacroiliac joint arthrodesis surgery may be considered in trauma-related injuries resulting in destruction and instability of the SIJ (eg, severe arthropathy). Injuries of this nature can be caused by a number of mechanisms, including dislocation and fractures.[25]

Pain at the SIJ may be an indication for SIJF, which can be caused by the above mechanisms, SIJ dysfunction, or idiopathically. However, fixation surgery in patients with SIJ pain can be a subject of contention.[7] For this reason, patient-specific findings can be relative indications for surgery.

When considering nonemergent pain at the SIJ, SIJF may be a treatment option after conservative therapies have failed.[7,9,26] See the Young-Burgess classification for pelvic fractures.[26]

Sacroiliac joint fixation can be implemented unilaterally or bilaterally. A literature search revealed a paucity of clinical studies comparing the benefits of unilateral and bilateral approaches to SIJF. For example, citations were found regarding a biomechanical study of artificially fractured pelvic models demonstrating a mechanical advantage between a lengthened sacroiliac screw (ie, bilateral) compared with short sacroiliac screw (ie, unilateral). Additionally, 2 lengthened screws at S1 and S2 were found to be superior to a single lengthened screw.[27,28] Another citation showed successful fixation (ie, bilateral) after a failed unilateral fixation.[29] However, poor clinical outcomes were reported in another study using a bilateral approach.[30]

Future investigations in this may area may elucidate a preferred surgical method that has valid and reproducible outcomes for pain related to the SIJ.

Due to the complex regional anatomy surrounding the SIJ, fixation surgery can lead to several complications. Iatrogenic injury to neurovascular structures could lead to hemorrhage or sensorimotor sequelae. Injury to osseous or ligamentous structures could affect joint stability. Additionally, surgery may fail to relieve pain or maintain fixation when hardware loosens or when borders fail to unite. Lastly, as with many surgeries, there are concerns for infection and thromboembolism. All these complications, or combinations thereof, have the potential to cause pain.[25,31] Newer methods of minimally invasive surgery show promise.[21,32–36]

*(continued on page 11)*

*(continued from page 10)*

## Conclusion

This 55-year-old female with 7 years of chronic LBP following left SIJF was treated with CMOs incorporating a heel lift that leveled her sacral base. The result was a successful reduction of self-reported pain scores that coincided with the leveling of the patient's sacral base.

Orthotic treatment can be beneficial with few side effects, if any, and it is an inexpensive treatment option. Therefore, the use of orthotics in future patients experiencing chronic LBP following unilateral SIJF with an unleveled sacral base should be considered in light of this case finding. When one thinks of fixation, it can be surprising to learn that freedom remains for postural correction in this case of a unilateral SIJF.

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*(continued on page 32)*

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**Authors:** James A. Lipton, DO, CSP-OMM, FAAO, FAAPMR, FAOCPMR, and 2LT Jochen A. Granja Vasquez, MS, MSC, USAR, OMS IV

**Publication:** *The AAO Journal*, Vol. 26, No. 2, June 2016, pages 7-11, 32

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Complete the quiz to the right by circling the correct answers. Send your completed answer sheet to the American Academy of Osteopathy. The AAO will forward your results to the American Osteopathic Association. You must answer 75% of the quiz questions correctly to receive CME credit.

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1. According to the article, which of the following statements regarding unilateral sacral iliac joint fixation is true?
   a. The literature is well documented on the efficacy of unilateral vs bilateral fixation.
   b. A single lengthened screw was found to be superior to 2 lengthened screws.
   c. A successful transsacral fixation was described after a failed unilateral fixation.
   d. It is not the treatment of choice.
   e. None of the above.

2. Sacroiliac joint fixation surgery can be associated with which of the following?
   a. iatrogenic injury
   b. sensorimotor sequellae
   c. hemorrhage
   d. osseous injury
   e. all of the above

3. The Young-Burgess classification pertains to:
   a. humerus fractures
   b. rib fractures
   c. femur fractures
   d. pelvic fractures
   e. none of the above

4. The orthotic correction described in this case study involved the use of which of the following?
   a. knee bracing
   b. ankle bracing
   c. heel lift
   d. custom molded orthotics with bilateral heel lifts and built-in lateral wedging
   e. heel lift that was replaced with custom-molded orthotics with built-in asymmetrical heel lift and medial wedging

Below are the answers to *The AAO Journal's* March 2016 quiz on the article titled "The Use of Osteopathic Manipulative Treatment for Acute Dental Pain: A Case Report" by Karen Teten Snider, DO, FAAO.

1. **b.** Dental pain was not the primary reason for the patient's visit.
2. **b.** The patient also reported back pain.
3. **c.** High-velocity, low-amplitude thrust was not applied to the cervical area.
4. **d.** According to the article, drainage and irrigation, saline oral rinse, and antibiotics are all conventional treatments for dental abscesses.

Answers to the *AAOJ's* June 2016 CME quiz will appear in the next issue.

# Walking Toward Health:
## New Evaluations in Gait

**July 29-31, 2016 • The Pyramids, Indianapolis**

### Course Description

Edward G. Stiles, DO, FAAO, and Charles A. Beck, DO, FAAO, will present research data that support using a functional approach to treat patients for gait dysfunctions.

During the past few decades, gait concepts have evolved from using a leg-propelling model to using the trunk-driving model that Serge Gracovetsky, PhD, outlined in his book *The Spinal Engine*. Dr. Stiles suggests that combining these two models with the floating compression pelvic model and the Mitchell axes model will provide a comprehensive understanding of gait mechanics. With traditional approaches to osteopathic manipulative treatment, sacral- and innominate-related gait dysfunctions can persist. By employing the clinical approach presented in this course, physicians can be confident that their patients are walking toward health.

### Course Location

**Pyramid Three** (two buildings away from the AAO's office)
3500 DePauw Blvd., lower level, Conference Rooms A and B
Indianapolis, IN 46268
(317) 879-1881, ext. 220

### Course Times and Meal Information

Friday, Saturday and Sunday from 8 a.m. to 5:30 p.m. Breakfast and lunch will be provided. Please contact the AAO's event planner with special dietary needs at (317) 879-1881, ext. 220, or EventPlanner@academyofosteopathy.org.

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

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| Student member | $466 | $616 |
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The AAO accepts check, Visa, MasterCard and Discover payments in U.S. dollars. The AAO does not accept American Express.

### Course Directors

A 1965 graduate of what is now the A.T. Still University–Kirksville College of Osteopathic Medicine in Missouri, **Edward G. Stiles, DO, FAAO**, has a rich and deep understanding of numerous pioneering concepts, events and personalities in osteopathic medicine.

While an osteopathic medical student, Dr. Stiles trained with George Andrew Laughlin, DO, a grandson of Andrew Taylor Still, MD, DO. Early in his medical career, Dr. Stiles took over the Cambridge, Massachusetts, practice of Perrin T. Wilson, DO, an internationally recognized osteopathic physician and the second person to lead the American Academy of Osteopathy. Dr. Stiles established the first hospital-based osteopathic manipulative treatment (OMT) service in the United States, and he helped develop the first OMT billing codes. Additionally, he has been recognized by the American Osteopathic Association as a Great Pioneer in Osteopathic Medicine.

Dr. Stiles has taught at the osteopathic medical colleges at Oklahoma State University, Michigan State University and the University of Pikeville in Kentucky. He has delivered the American Osteopathic Association's Andrew Taylor Still Memorial Address, as well as the Academy's Thomas L. Northup Lecture, its Scott Memorial Lecture and its Harold A. Blood, DO, FAAO, Memorial Lecture. Dr. Stiles also is a recipient of the Academy's highest award, the Andrew Taylor Still Medallion of Honor.

Like Dr. Stiles, **Charles A. Beck, DO, FAAO**, is board certified in neuromusculoskeletal medicine. He earned his DO degree from the University of Pikeville-Kentucky College of Osteopathic Medicine (UP-KYCOM).

Dr. Beck has received many awards, including the Edward G. Stiles Award for Osteopathic Manipulation from UP-KYCOM, and he serves as an adjunct faculty member for several osteopathic medical schools, including the Lake Erie College of Osteopathic Medicine and the Marian University College of Osteopathic Medicine. Dr. Beck is in private practice in Indianapolis at the Meridian Holistic Center.

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Richard G. Schuster, DO

# Osteopathic Neuromusculoskeletal Medicine in the 21st Century

Anaheim Convention Center

Daniel G. Williams, DO, program chair
Laura E. Griffin, DO, FAAO, 2016-17 AAO president

Learn about emerging concepts in the field of manual medicine, including medical imaging and musculoskeletal evaluation and treatment, as they relate to the disciplines of neuromusculoskeletal medicine, sports medicine, family medicine and pediatrics.

This year's program will feature joint sessions with the American Osteopathic Association of Sports Medicine, the American Osteopathic College of Physical Medicine and Rehabilition, the American College of Osteopathic Pediatricians, the American College of Osteopathic Family Physicians, and the Osteopathic International Alliance.

In addition, Martin S. Levine, DO, will deliver the 43rd annual Thomas L. Northup Lecture.

## Topics and speakers

"Common Myofasial Trigger Points" with Robert Gerwin, DO
"Introduction to Dry Needling" with Robert Gerwin, DO
"Diet and Fitness Industry Review—Get Off the Hamster Wheel!" with Steve Karageanes, DO, FAOASM
"Functional Movement Screen Workshop" with Steve Karageanes, DO, FAOASM
"Lumbar MRI Interpretation" with Michael Wilcynski, DO
"A Rational Approach to Diagnosing and Treating Low Back Pain" with Lisa Ann DeStefano, DO
"Yoga for Rehabilition and Performance Improvement" with Stacey L. Pierce-Talsma, DO, MS, FNAOME
"Concussion Evaluation and Management" with Priscilla Tu, DO
"Treatment of the Dura for Concussion" with Kenneth J. Lossing, DO
"Osteopathic Considerations in the Pediatric GI Patient, Parts 1 and 2" with Kimberly J. Wolf, DO and Stacey L. Pierce-Talsma, DO, MS, FNAOME
"Evaluation and Management of the Crossed Syndromes" with Shawn Kerger, DO, FAOASM, and Richard G. Schuster, DO

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# The Use of Osteopathic Manipulative Treatment as Part of an Integrated Treatment for Infantile Colic: A Case Report

CASE REPORT

**Karen Teten Snider, DO, FAAO**


## Abstract

Infantile colic is a common disorder of early infancy that occurs between 2 weeks and 4 months of age. Colic is characterized by excessive crying for more than 3 hours per day for more than 3 days per week for more than 3 weeks.

The underlying etiology of colic is unknown but may include infantile migraine, gastroesophageal reflux, constipation, cow's milk protein intolerance, and abnormal gut flora.

While simethicone is the most common treatment for colic, manual therapies, including osteopathic manipulative treatment (OMT), and probiotics have both demonstrated improvement in colic symptoms.

The current case describes successful management of infantile colic using a multi-treatment approach to target a variety of potential causes. Treatment included oral probiotics for the infant, removing milk protein from the breastfeeding mother's diet, and OMT to correct underlying somatic dysfunctions that may have caused gastrointestinal or migraine symptomatology.



From the A.T. Still University– Kirksville College of Osteopathic Medicine, Missouri.



Financial disclosure: none reported.



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## History

A 6-week-old boy was brought to the clinic for evaluation and treatment for colic symptoms. The mother reported that the infant became fussy in the early evenings and would cry for up to 3 hours at a time. The symptoms began at 2-3 weeks of age and occurred daily since that time.

When he cried, the infant appeared uncomfortable using a high-pitched cry and frequently drawing his feet up. The mother reported that the symptoms were aggravated by feeding and relieved by bowel movements, burping, and consoling. He is the third child of his parents, and the mother reported he cries much more throughout the day than her other 2 children.

The patient was the product of full-term uncomplicated pregnancy and a vaginal delivery without complications. Since birth, he has not had any illnesses, except his current symptoms. He was breast fed, growing appropriately, and meeting his developmental milestones. He had a circumcision. His parents are married nonsmokers who live together. The mother was G3P3 without any medical problems. He had 2 healthy older brothers, though the oldest brother was treated for plagiocephaly with osteopathic manipulative treatment.

The patient had no other symptoms at the time of evaluation and his mother denied any recent fever, lethargy, pallor, weight loss, nasal congestion, rhinorrhea, eye discharge, cough, respiratory distress, stridor, abdominal distention, abdominal rigidness, blood in stool, diarrhea, inadequate burping, mucus in stool, spitting up, underfeeding, vomiting, malodorous urine, penile swelling, scrotal swelling, bulging fontanelles, rashes, neck stiffness, or torticollis.

## Physical Examination

On physical examination the infant's length was 20.5 inches; head circumference was 15 inches; weight was 11 pounds; and his temperature was 98.4 degrees. He appeared healthy and well nourished. His head demonstrated a mild left lateral sphenobasilar symphysis strain without significant flattening of the occipital region. Sutural restrictions were noted in the right coronal, posterior

*(continued on page 16)*

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sagittal, and left occipital mastoid sutures. Suckling was intact and appeared symmetrical without dysfunction.

No abnormalities of the infant's eyes, ear, or nose were noted. He appeared to swallow frequently. No abnormalities or somatic dysfunctions were noted of his chest, ribs, cervical, thoracic, or lumbar spine.

Restricted motion was noted in the upper, middle, and lower poles (S1, S2, and S3) of the right sacroiliac joint. Visceral myofascial restrictions were noted in the pylorus region and in the right upper quadrant at the falciform ligament and in left lower quadrant. Mild gaseous distention was noted. No masses or organomegaly were noted. He moved all 4 extremities equally, and no deformities were noted.

The assessment included infantile colic (ICD-10 R10.83); excessive crying (ICD-10 R68.11); possible gastroesophageal reflux (K21.9); and somatic dysfunction of the head region (ICD-10 M99.0), abdomen (ICD-10 M99.9), and sacral region (ICD-10 M99.04).

## Treatment

Osteopathic manipulative treatment (OMT) was performed to address the somatic dysfunctions found in the head, sacral, and abdominal regions. Osteopathic cranial manipulative medicine (OCMM) and myofascial release were applied to the head region. Myofascial release and articular technique were applied to the sacral region. Visceral techniques were applied to the abdominal region.

The OMT was well tolerated, and somatic dysfunction was improved in all regions. The mother was directed to begin administering oral probiotics to the patient, to personally discontinue milk products, and to continue breastfeeding. The patient was to follow up in the clinic in 2 weeks.

The patient was brought for follow-up evaluation in 2 weeks as scheduled. The mother reported that the symptoms had improved with only a few periods of fussiness and high-pitched crying and that the 8-week-old infant was now sleeping through most of the night. The mother also reported that she removed milk products from her diet.

Physical examination at the follow-up visit revealed marked improvement in somatic dysfunction in the head and sacrum and no somatic dysfunctions in the abdomen. OCMM and myofascial release were applied to the remaining somatic dysfunctions of the head and sacrum. The mother was instructed to continue with current home-based treatment and to follow up as needed.

## Discussion

Crying in young infants is a sign of discomfort. Crying can be from multiple causes, such as hunger, pain, distress, illness, or tiredness.[1]

At 6 weeks of age, the average infant cries 3 hours per day, the most of any time during infancy, and the crying most commonly occurs in the late afternoon and evening. By 8 weeks, crying typically decreases to 2 hours per day, and then to 1 hour per day by 12 weeks.[1]

Colic is defined as excessive crying for more than 3 hours per day for more than 3 days per week for more than 3 weeks.[1,2] Colic most commonly occurs between 2 weeks and 4 months of age. The crying associated with colic tends to be paroxysmal without any identifiable cause and often occurs with flexing of the hips and knees and passing flatus.[1-4]

In this case, the infant had been crying up to 3 hours each evening with fussiness throughout the day and had been symptomatic for 3-4 weeks, thus meeting the clinical definition of colic.

The underlying etiology of colic is unknown. Fewer than 5% of infants are found to have an organic etiology to the crying.[1,3,4]

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Potential organic causes not readily discernible by physical examination include infantile migraine, gastroesophageal reflux disease (GERD), constipation, cow's milk protein intolerance, and abnormal gut flora.[3,4] The treatment in the current case targeted each of these potential causes.

Recent literature has linked colic to infantile migraine.[5,6] Gelfand et al[5] found that infants of mothers with a history of migraine cephalgia were 2.6 times more likely to have colic. Romanello et al[6] found that children and adolescents who suffered from migraine headaches were 6.6 times more likely to have had a personal history of infantile colic. Because of the strong genetic predisposition for migraine,[7,8] researchers have speculated that colic may be a manifestation of infantile migraine.[6] OMT has been shown to be efficacious in the treatment of migraine cephalgia in adults both in reducing pain intensity and in total days with headache.[9]

> **"Excessive tension in the falciform ligament may lead to GERD in neonates.**

The patient in the current case manifested both cranial and sacral somatic dysfunctions which were treated with OMT, including OCMM. Reduction in somatic dysfunction coincided with reduction in symptomatology; therefore, if the infant had been suffering from infantile migraine, the OMT may have improved the symptoms.

While the infant in this case did not overtly demonstrate GERD, he was swallowing frequently, which is a symptom of GERD in infants.[10] GERD is very common in infants, with an incidence up to 50% in infants younger than 3 months of age,[10] and it can be a cause of infantile colic.[4,11,12] Anything that causes the lower esophageal sphincter (LES) between the stomach and esophagus to relax or anything that increases the pressure below the LES can cause GERD.[10] Potential causes in the young infant include unequal tension of the diaphragmatic crura, transient LES relaxation, abnormal angle between the esophagus and the stomach (angle of His), delayed gastric emptying, and decreased peristalsis of the esophageus, such as seen with esophagitis.[10]

Clinical experience of the author has suggested excessive tension in the falciform ligament may lead to GERD in neonates via the ligament's fascial connection to the diaphragm. The falciform ligament is a remnant of the ventral mesentery and connects the liver to the anterior body wall.[13]

In the neonate, the falciform ligament envelops the umbilical vein as it courses from the umbilicus to the porta hepatis.[14] When the umbilical cord is cut after birth, the tissue contracts to eventually become the ligamentous teres hepatis.[14] Excessive tension in this structure can affect the contiguous structures of the upper gastrointestinal system and the abdominal diaphragm.

The infant in this case study demonstrated tension in the right upper quadrant of the abdomen in the region of the falciform ligament. This fascial restriction along with restrictions found in the epigastrium and the left lower quadrant of the abdomen were resolved using gentle direct and indirect visceral myofascial techniques. No abdominal somatic dysfunction was present on physical examination 2 weeks later.

Constipation also has been associated with colic.[4] The infant in the current case was not constipated, but the mother noted that the colic symptoms were relieved by bowel movements. These symptoms along with the abdominal somatic dysfunction suggested a bowel etiology was involved in this case.

Manual therapies directly treating the abdomen, such as abdominal massage, have shown significant benefits in treating constipation with many studies focusing on children with constipation.[15-19]

In a small study specifically comparing OMT, including visceral manipulation, to OMT plus conventional therapy for the treatment of constipation in children with cerebral palsy, Tarsuslu et al[20] found no differences between the groups, suggesting that OMT alone is a viable treatment for constipation.

Infancy is a period of rapid change in the gastrointestinal flora of the body. Studies have found a wide diversity of gastrointestinal flora within 1 week of age.[21,22] The colonizing flora is dependent upon extrinsic exposure to both nutrition and antibiotics. Colonization with abnormal gut flora is a potential cause of colic because abnormal gut flora can cause excessive gas, constipation, intestinal cramps, delayed gastric emptying, and food hypersensitivity.[21,23]

Several studies have demonstrated that infants with colic benefit from probiotic supplementation.[23-26] Additionally, probiotics are a cost-effective approach that have been shown to be superior to simethicone, the most widely used treatment for colic.[26] With this research in mind, the infant in this case was placed on oral probiot-

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ics, and milk was removed from the mother's diet as part of the care plan.

Research on the effect of OMT on colic is mostly limited to case studies, case series, and a few small randomized studies. A Cochrane review of over 227 manuscripts involving manual therapies for colic found only 6 randomized studies that specifically investigated manual therapies and that were considered of high enough quality to include in a meta-analysis, but the small sizes of the 6 studies did not allow for adequate power to reach statistical significance.[27]

Of the 6 randomized studies included in the meta-analysis, only 4 were available through PubMed.[28-31] Each of these 4 studies included a control or placebo group.

Olafsdottir et al[30] compared a low-velocity, moderate amplitude spinal manipulation to a placebo treatment that involved a nurse holding the infant for 10 minutes. While the treated group showed more improvement than the placebo group, the difference was not statistically significant.[30]

Miller et al[29] found that infants who were treated with low-velocity, moderate amplitude spinal manipulation were 8 times more likely to improve by day 8 than untreated infants, and they found that 3 infants needed to be treated to achieve 1 infant with significant improvement.

Wilberg et al[31] compared the results of using manual therapies for 2 weeks to treat infants with colic to the results of using simethicone. They found that manual therapies were superior to simethicone within 5 days.

Hayden et al[28] found that OMT, including OCMM, directed at patient-specific physical findings significantly improved sleep and decreased crying compared to untreated infants.

## Conclusion

The current case demonstrates the advantage of using a multi-treatment approach. The combined use of OMT with probiotics provides treatment for many of the potential etiologies of infantile colic, including infantile migraine, GERD, constipation, and abnormal gut flora.

To determine the full effect of OMT on infantile colic, more studies are needed to assess the effect of OMT when used alone. However, with available evidence supporting the benefits of multiple treatments,[9,15-19,23-26,28,29,31] the best practice for our patients is to treat the whole person, directing treatment at each underlying etiology.

## Acknowledgments

Dr Snider originally prepared this case report to meet one of her requirements for earning fellowship in the American Academy of Osteopathy. As a consequence, this manuscript underwent 2 separate peer-review processes: The first was through the Committee on Fellowship in the American Academy of Osteopathy, and the second was through *The AAO Journal*. Dr Snider became a fellow of the AAO in March 2015 during the Academy's Convocation in Louisville, Kentucky.

*(References on page 33)*

# What's the Point?

## Multifaceted Clinical Approaches to Viscerosomatic Reflexes

**Oct. 21-23, 2016 • Midwestern University/Arizona College of Osteopathic Medicine in Glendale**

Palpable somatic "points" provide the osteopathic clinician with key insights directing differential diagnoses and focused approaches to patient systemic complaints. Interestingly, from those using Chapman's reflexes or Jones' counterstrain points to those who integrate acupuncture concepts or Travell's myofascial trigger points, insightful clinicians have noted a significant overlap and a great deal of similarity in clinical presentations.

Working from Chapman's approach, this course will compare and contrast a number of clinically relevant points, focus on practical diagnostic and therapeutic clues and organize the information in a practical manner for patient care. Emphasis will be placed on developing and expanding skills and strategies to speed diagnosis and recovery.

Residents, residency trainers and directors of medical education will be accorded special tips for maximizing the integrative focus of this course.

### Course Faculty

Led by course director Michael L. Kuchera, DO, FAAO, the faculty will include William H. Devine, DO, and Richard A. Feely, DO, FAAO, FCA. Additional faculty may be added as attendance requires.

### Course Times

Friday and Saturday, 8 a.m. to 5:30 p.m. Sunday, 8 a.m. to noon.

### Continuing Medical Education

20 credits of NMM-specific AOA Category 1-A CME anticipated.

### Meal Information

Breakfast will be provided each day. Lunch will be provided Friday and Saturday. Contact the AAO Event Planner Gennie Watts with special dietary needs at (317) 879-1881, ext. 220, or EventPlanner@academyofosteopathy.org.

### Course Location

**Midwestern University/Arizona College of Osteopathic Medicine**
Agave Hall, OMT Lab 101, 19555 N. 59th Ave., Glendale, AZ 85308

### Travel Arrangements

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

### Course Faculty

**Michael L. Kuchera, DO, FAAO**, is a professor of osteopathic manipulative medicine at the Marian University College of Osteopathic Medicine in Indianapolis. Dr. Kuchera frequently lectures on the diagnosis and management of somatic dysfunction in patients with pain, systemic disorders or specific neuromusculoskeletal complaints.

An internationally recognized educator, **William H. Devine, DO**, is a professor of osteopathic manipulative medicine (OMM) at the Midwestern University/Arizona College of Osteopathic Medicine (MWU/AZCOM) in Glendale, where he also serves as the director of postgraduate OMM, the director of the musculoskeletal medicine residency and the coordinator of the osteopathic specialty clinic.

Since 2000, **Richard A. Feely, DO, FAAO, FCA,** has operated the Feely Center for Optimal Health in Olympia Fields, Illinois, where he uses osteopathic manipulation and acupuncture to provide relief from headaches and muscle and joint pain. In addition, he serves as an adjunct professor of OMM at the Midwestern University/Chicago College of Osteopathic Medicine in Downers Grove, Illinois, and at the Western University of Health Sciences College of Osteopathic Medicine of the Pacific in Pomona, California.

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# Cranial Approach of Beryl E. Arbuckle, DO

## Dec. 2-4, 2016 • Midwestern University/Arizona College of Osteopathic Medicine in Glendale

This course traces the cranial approaches of William Garner Sutherland, DO; Beryl E. Arbuckle, DO; and Robert Fulford, DO. Dr. Arbuckle was one of Dr. Sutherland's earliest students, studying with him before he taught using primary respiration as a therapeutic force. Diagnosis was performed by palpating the position of the cranial bones and motion testing. In her work with children, Dr. Arbuckle mostly used direct techniques.

Dr. Arbuckle was able to attend hundreds of autopsies, mostly on pediatric neurological cases. She observed regularly arranged fibers in the dura that she called "stress fibers." She also noted that the skull was reinforced in certain places, which she called buttresses. The stress bands and buttresses are used in both diagnosis and treatment.

Attendees will explore the embryology of the head; motion test the sphenobasilar suture, the cranial base, the face, the buttresses, the cranial-cervical junction, and the sacrum; unlock the bony skull and the membranes; work with stress bands; and explore the significance of thoracic respiration.

### Continuing Medical Education
24 credits of NMM-specific AOA Category 1-A CME anticipated.

### Course Times
Friday and Saturday from 8 a.m. to 6 p.m.
Sunday from 8 a.m. to 4 p.m.

### Meal Information
Breakfast and lunch will be provided each day. Contact AAO Event Planner Gennie Watts with special dietary needs at (317) 879-1881, ext. 220, or EventPlanner@academyofosteopathy.org.

### Course Location
**Midwestern University/Arizona College of Osteopathic Medicine**
Agave Hall, OMT Lab 101
19555 N. 59th Ave., Glendale, AZ 85308

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

### Course Director
A 1994 graduate of what is now the A.T. Still University–Kirksville College of Osteopathic Medicine, **Kenneth J. Lossing, DO,** served an internship and combined residency in neuromusculoskeletal medicine and family practice through the Ohio University Heritage College of Osteopathic Medicine in Athens. He is board certified in both neuromusculoskeletal medicine and family medicine.

Dr. Lossing studied visceral manipulation with Jean-Pierre Barral, DO (France). An internationally recognized lecturer, Dr. Lossing contributed to the second and third editions of the American Osteopathic Association's *Foundations of Osteopathic Medicine* textbook.

As the AAO's 2014-15 president, Dr. Lossing was featured in a segment of "American Health Front!" that focused on osteopathic manipulative medicine.

Dr. Lossing and his wife, Margret Klein, OA, run a private practice in San Rafael, California.

| Registration Fees | On or before Sept. 30 | Oct. 1 through Nov. 26 | On or after Nov. 27 |
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**Cranial Approach of Beryl Arbuckle, DO**

**Dec. 2-4, 2016**

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# Can The Concept Stand The Test Of Time?

**Viola M. Frymann, DO, FAAODist, FCA**



## Introduction

On May 29, 1953, two men, both endowed with outstanding stamina and skill and inspired by an unflinching resolve, reached the top of Everest and came back unscathed to rejoin their comrades. A New Zealand mountaineer, Edmund Hillary, was knighted by the Queen of England for this superb accomplishment; his companion, Tenzing, a Sherpa from Nepal, was also honored for his achievement.

Yet this was not the whole story, for the ascent of Everest was not the work of one day, nor even of those few anxious unforgettable weeks of preparation and training. It was, in fact, a tale of sustained and tenacious endeavor by many over a long period of time. It was over 30 years since an expedition was first sent to explore the mountain with the serious intention of making a subsequent attempt to climb it. Since that first expedition, no less than 11 major expeditions have followed one another. On three of these attempts, ascent was accomplished to within 1,000 feet of the summit only to be interrupted at the limit of endurance or by climatic conditions. A number of lives had been lost in these attempts.

Thus, this final accomplishment was but the climax to a story which had already been lived and written in large part before this expedition set out.[1]

The mastery of the mysteries of nature as they pertain to the human body is similarly a story of many unsuccessful or partially successful endeavors which laid the foundations for outstanding discoveries. We pay tribute by immortalizing the name of the one who finally "reached the summit." The accumulation of knowledge over thousands of years is suddenly synthesized by a wise, logical, analytical mind into a law of nature as unchangeable as the courses of the celestial bodies in their orbits. One such physiologic law is that of the circulation of the blood. It is almost impossible to conceive of a theory of function of the heart and blood vessels without the concept of a circulation, and yet this fact has been accepted for a mere 400 years, after some 4,000 years of attempts to understand the function of these organs. A journey down the labyrinthine ways of philosophic, scientific and physiologic thought through the ages provides a demonstration of the evolution of the understanding of the true nature of life.

Viola M. Frymann, DO, FAAODist, FCA, a scion of the osteopathic profession, died Jan. 23, 2016. She was internationally recognized for her approach to treating children.

Dr. Frymann delivered this Sutherland Memorial Lecture in 1963 for the meeting of the Cranial Academy at New Orleans. William Garner Sutherland, DO, is credited with establishing the concepts that undergird osteopathic cranial manipulative medicine, and he was a mentor to Dr. Frymann.

In her lecture, Dr. Frymann looked back at the development of our modern understanding of anatomy to answer the question "Can the concept stand the test of time?"

The text, originally published in the AAO's 1966 yearbook, has undergone minor editing to update spelling and punctuation.

## Ancient Understandings

Far back, some 3,000 years before Christ, a civilization existed in China which subscribed to a philosophy of health, disease and therapeutics which has not yet been completely superseded. No dissection was countenanced by their religion, yet their understanding of physiology was remarkable. Of the circulation of the blood, they stated, "All the blood is under control of the heart ... the heart regulates all the blood of the body … the blood current flows in a continuous circle and never stops. It may be compared to a circle without beginning and without end."[2]

About the same period, there arose an advanced civilization in Egypt. According to the oldest scientific surgical treatise known, the Edwin Smith Papyrus, the original of which was written about 3,000 to 2,500 B.C., the heart was regarded as the center of a system of distributing vessels; the importance of the pulse was stressed and its rate noted. The author of this papyrus was surprisingly near recognition of the circulation of the blood. The anatomic knowledge of the Egyptians was extensive and was probably due to the wide-spread practice of embalming with attendant evisceration.

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Two thousand years later, the Greeks, who eschewed dissection because they regarded the body as sacred, did not possess the anatomical knowledge of the Egyptians. Empedocles, a student of Pythagoras, believed the heart to be the seat of consciousness. He also taught that it was the center of the vascular system and that there was a flow and reflux of blood to and from the heart.

Around 300 B.C., the first public dissections of the human body were performed, and Herophilos, whom posterity has called the Father of Anatomy, made the first clear distinction between arteries and veins. He emphasized that they contained blood and not air. He studied the pulse and regarded it as an index of the strength of the heart.

> **"Erasistratus observed that every organ is supplied by an artery, a vein and a nerve.**

Erasistratus, a younger contemporary, in 290 B.C., added further information to the concept of a blood vascular system. He observed that every organ is supplied by an artery, a vein and a nerve. He regarded the heart as the source of both arteries and veins. He described the semilunar valves and the tricuspid valve and realized that they prevented the reflux of blood. He described and named many of the major arteries.[3]

Almost 400 years elapsed before the next great contributor to medical knowledge appeared. This was Galen, born in Pergamon in Asia Minor. He constantly stressed the importance of anatomy, which he studied extensively. He observed that the heart has four cavities and four orifices, three of them having valves with three cusps, one having only one cusp. Unfortunately, his description of the physiology of the vascular system was in error. For example, he regarded the liver as the center of the venous system and claimed that it endowed the blood with a particular "natural spirit." Then the blood, charged with the "natural spirit" and with nutritive substances derived from the intestines, was distributed by the liver throughout the venous system, ebbing and flowing in the veins. He also believed that venous blood in the right ventricle passed through small channels in the interventricular septum where it came into contact with air which had passed into the left ventricle from the lungs through the pulmonary vein. Here, in contact with the "natural spirit" which had been drawn in from the "world spirit," it was transformed into the highly refined "vital spirit" which was distributed through the arteries with the arterial blood. The arteries to the brain carried this vital spirit which, in the brain, was transformed into animal spirit *and then distributed through the nerves to the various organs of the body*. More than 1,000 years elapsed before anyone ventured to disagree with his teachings. But some 1,500 years elapsed before the significance of the last phrase was even contemplated.

## Postclassical–Early Modern Advances

Ibn al-Nafis, an Arabian physician of the 13th century, made the discovery that there were no pores in the interventricular septum. Moreover he described the lesser or pulmonary circulation, "blood rises in the pulmonary artery to the lung ... to be mixed with air and passes to the pulmonary vein in which it is transmitted to the left cavity of the heart." Unfortunately, this observation remained unknown to the Western world for seven centuries.

Three hundred years later, Servetus, a Spaniard who was ultimately burned at the stake for his radical ideas, gave a very clear description of this pulmonary circulation in his treatise of 1553. But his valuable observation was unnoticed for 150 years. A contemporary of Servetus, Colombo, a well-known anatomist in Italy, also provided an accurate description of the pulmonary circulation and pointed out the error in the idea of perforations in the interventricular septum.

In 1571, Cesalpino, professor of medicine at Pisa, wrote some remarkable passages about the circulation of the blood:

> The circulation of the blood which takes place from the right ventricle to the left ventricle, in passing through the lungs, agrees quite exactly with the following facts, which are apparent from dissection. There are two vessels, which end in the right ventricle, two in the left. One of the two is afferent, the other efferent.

He further states that "the blood is conducted to the heart by the veins and is carried by the arteries throughout the body." He noted that "veins are engorged below a ligature, not above." He was the first author to use the word "circulation."

But the credit and honor for discovering the circulation of the blood goes to William Harvey, an Englishman who studied medicine in Padua and Cambridge. In 1616, he delivered his first lectures as the newly appointed Lumleian lecturer to the Royal College of Physicians. In the manuscript notes of these lectures, it states that "William Harvey demonstrates by the structure of the heart that the blood is constantly passed through the lungs into the aorta .... he demonstrated by the ligature, the passage of blood

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from arteries to veins. Thus is proved a perpetual motion of the blood in a circle caused by the pulsation of the heart." It was 1628 before his famous *De Motu Cordis* was published in Frankfurt. This work is praised as a model of inductive reasoning. Harvey reviewed previous physiological opinions both ancient and modern, he emphasized the necessity of observation of the beating of the hearts of animals, and then stated his own views thus: "First the auricle contracts and this forces the abundant blood it contains ... into the ventricle. This being filled, the heart raises itself, makes its fibers tense, contracts and beats. By this beat, it at once ejects into the arteries the blood received from the auricle; the right ventricle sending its blood to the lungs through the vessel called vena arteriosa (pulmonary artery) ... the left ventricle sending its blood to the aorta and to the rest of the body through the arteries" from whence it returns by way of the veins to the right auricle. He praised the work of Colombo on the pulmonary circulation, with which he agreed, and he mentioned the work of Fabrizio on the valves of the veins.

Thus, a physiologic law was defined. For 4,500 years, philosophers, physicians, and scientists had speculated, contemplated and investigated with varying degrees of success, the role of the heart and blood vessels. William Harvey was steeped in the earlier concepts. Then, he studied the anatomy of the heart and blood vessels. Then he interpreted the anatomical facts by logical deduction and thereby discovered the physiological law which governed their function. Many details have been added since, but they have not changed one iota of Harvey's definition of the law of the circulation of the blood. His contribution will stand forever because it is an expression of unchangeable physiologic law.

## William Garner Sutherland, DO

Tonight however, we have gathered here in remembrance of William G. Sutherland, and not to pay tribute to William Harvey. The name Sutherland does not share the universal renown of that of Harvey, but it is possible that within 400 years it might? It remains to posterity to prove or disprove the value of any contribution to art, science or philosophy, but a comprehensive view of Sutherland's concept as it stands today, and a review of pertinent history through the ages may provide a preview of posterity's judgement.

William Garner Sutherland was born in New Brunswick 90 years ago. It is nine years since he left this earthly sphere of endeavor, entrusting to the osteopathic profession a concept of inestimable value. William Sutherland was a blacksmith's son. By the age of 14, hard times for the family necessitated his working and thus began a career in the newspaper world. At the age of 20, he was finally able to devote himself to his education at Upper Iowa University. He returned to journalism. Rumors about a Dr. Andrew Taylor

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Still in Kirksville, Missouri, aroused his attention. Then, one of these osteopathic physicians, graduated from this new school in Kirksville, opened a practice locally. Sutherland grew to know him well. Finally, his curiosity drove him to take a leave of absence from his newspaper and visit Kirksville for himself. This was a turning point in his life, and before he returned home, he was convinced that here, in the field of osteopathy, lay his life's work. Thus it came about that in 1898, Sutherland enrolled in the American School of Osteopathy in Kirksville.

During his life at the school, he delved into the depths of osteopathic principles as Dr. Still presented them. He grew to think and reason with Dr. Still. It was his custom when on his way to class in the mornings to linger before the display cabinet of Dr. Still's bone collection and ponder their significance in health and disease. One morning, during his second year at school, he was contemplating the bones of the skull that were mounted in their correct relationship, but slightly separated. "As I stood looking and thinking," he said, "in the channel of Dr. Still's philosophy, my attention was called to the bevelled articular surfaces of the sphenoid bone. Suddenly there came a thought—I call it a guiding thought—bevelled like the gills of a fish, indicating articular mobility for a respiratory mechanism."[4] The full significance of this experience was not apparent for many years, but as time passed, it became the most powerful and unrelenting directive of his professional life.

In order to appreciate the impact of such a thought, it must be remembered that this occurred at a time when all anatomic texts taught that the adult skull was composed of a number of bones that achieved progressive fusion from the age of six years. Such a thought therefore seemed ridiculous, yet the reason for those bevels on the bones must surely be provision for movement. This persistent, nagging thought could not be overruled. It finally drove him to a minute examination of the articular surfaces of all the cranial bones: he related their forms to mechanical devices such as friction gears, pulleys, fulcrums and so on. Through studying their physiologic motions, through clinical experiments upon himself, eventually with all kinds of patients, gradually formulated the concept of the primary respiratory mechanism, the essential components of which are 1) the articular mobility of the cranial bones and sacrum, 2) the reciprocal tension function of the dural membranes both cranial and spinal, 3) the fluctuation of the cerebro-spinal fluid, and 4) the motility of the central nervous system. To him, this four-in-one concept was a fundamental law of physiologic action in operation as long as life persists. It may be perverted, impeded, inhibited, or distorted, but it must and will continue while there is life. Perhaps we are still too close to this significance, but a brief glance back down the ages will emphasize the feat of observation and deduction which this pronouncement represents, while a projected view into the future may bring encouragement that more substantial and acceptable instrumental 'scientific' proof may soon be forthcoming of this hypothesis.

**"Yin is the the negative, dark, cold female aspect whereas Yang is the positive, hot, light male aspect of the universe.**

## Chinese Philosophy: Tao, Yin, Yang and Qi

Let us return again to the wisdom of ancient China. Medicine was a part of philosophy and religion, both of which propounded oneness with nature. Tao is the way, the whole universe which includes the material and the non-material, nature and the supernatural. Tao has two aspects—Yin and Yang. "The Yin and the Yang are contained within the Tao, the basic principle of the whole universe. They create all matter and its transmutations." Yin is the negative, dark, cold female aspect whereas Yang is the positive, hot, light male aspect of the universe. They govern the rising and the setting of the sun, the different phases of the moon, the seasons, and man's health. Storms, drought, earthquakes and diseases are due to a disharmony between Yin and the Yang. Thus, restoration of the dynamic harmony between the Yin and the Yang forces within the body is believed to heal diseases.

The ancient Chinese taught that the Yin and the Yang energy of life, Qi, flows through the skin in 12 main paths or meridians. Upon the constant flow of Qi depends the health of the body.[5] *A blockage of Qi, causing excess in some parts and a deficiency in others, manifests itself in disease."*

This system of diagnosis and treatment was established at least 3,000 years before Christ. Thirty five years ago, the first treatise on this work appeared in Europe. Since then, International Congresses have been devoted to its study, the Bekterev Institute in the U.S.S.R. is conducting an extensive research program into it, it is being taught in several hospitals in France and in one hospital in Great Britain. Remarkable results have occurred, and research is beginning to explain them in cold, material scientific terms. What then is this system that has stood the test of some 5,000 years?

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## Diagnosis and Acupuncture

It is a process of diagnosis by the pulse and treatment by acupuncture or moxibustion. In *The Yellow Emperor's Classic of Internal Medicine*,[6] diagnosis was a very important precursor to the application of acupuncture, and the ancient Chinese developed an extremely accurate and quick method of diagnosis by palpation—palpation of the pulse. Twelve pulses are recorded, six at each wrist. The radial artery on each side is divided into three segments each about one-half inch long and each subdivided into an internal and external pulse. Each segment is palpated lightly and then under greater digital pressure to give a superficial and deep pulse. From this examination, the physician makes a diagnosis of the state of the whole body and localizes the area of the disease.

Treatment by acupuncture consists of the insertion of a needle at a specific point on the meridian of the organ involved at specific depths beneath the skin. The point is only about a tenth of an inch in diameter. The points are pricked in order to stimulate or to sedate the organ associated with the meridian. Stimulation at an acupuncture point may cause a reduction in spasm, pain and congestion in the vicinity.

It would be easy to dismiss this practice as an interesting but impractical chapter of medical history. Yet be not too hasty to cast it aside, for recent research into the action of acupuncture shows that it can cause a number of physiologic changes, e.g., in clotting time, sedimentation rate and blood sugar. A number of scientists have found that the electrical skin resistance is reduced at the acupuncture points as compared with the surrounding skin.

Perhaps there is something in common between acupuncture, Chapman's reflexes and Travell's trigger points.

## The Cause of Disease

This report emerging from the most ancient of civilizations where anatomical dissection was unknown, expresses several thoughts so closely related to osteopathic philosophy that they bear comparison. They may be condensed in the statement that a blockage of Qi, the energy of life, causing excess in some parts and "a deficiency in others manifests itself in disease." A.T. Still stated that the cause of disease is "a partial or complete failure of the nerves to conduct the fluids of life." He also said, "Tell me the moment when the blood flow is altered, and I will tell you the moment when disease begins." Sutherland stated that "primarily it is the normal fluctuation of the cerebro-spinal fluid that is back of all the changes in the body chemistry." Furthermore, "inactivity of the cerebro-spinal fluid, lymph and blood occurs, and at that moment disease begins."

It is also of great significance that in China it was already recognized that "the head is the home of will and intelligence," a fact not recognized by the Occident before Hippocrates so stated around 400 B.C.

A consideration of the anatomy of the central nervous system was first recorded in ancient Egypt. In the Edwin Smith papyrus, the word "brain" occurs for the first time; the author also described the convolutions of the brain and its membrane.

## The Importance of the Brain

The concept that the seat of intelligence and consciousness resided in the heart persisted throughout the Egyptian civilization and much of Greek civilization. Hippocrates however, around 400 B.C., who had none of the benefits of anatomical dissection, realized that "the brain is the most powerful organ of the human body. … Eyes, ears, tongue, hands and feet act in accordance with the discernment of the brain." About a century later, Herophilos by dissection of the human body recognized the brain as the central organ of the nervous system. He described the cerebrum, the cerebellum, the fourth ventricle and the meninges. He was the first to grasp the nature of the nerves and to distinguish motor from sensory nerves. He too regarded the brain as the seat of intelligence.

**"The concept that the seat of intelligence and consciousness resided in the heart persisted throughout the Egyptian civilization and much of Greek civilation.**

A younger contemporary of Herophilos, Erasistratus, extended these anatomical observations and distinguished between the cerebrum and cerebellum. He recognized the greater complexity of the convolutions of the human brain as compared to that of animals and associated it with higher intelligence. His concept of the function of blood and its vessels was rather confused by modern standards, but he concludes his description with a phrase that is interesting: "The 'vital spirit' which was a peculiar pneuma derived from air was carried to the brain by the arteries, there to be changed into the 'animal spirit' which was distributed by the nerves to the various organs of the body." At that time, the cerebro-spinal fluid was

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# Fulford's Advanced Percussion Hammer

## Dec. 2-4, 2016 • University of North Texas Health Science Center Texas College of Osteopathic Medicine in Fort Worth

Based on the life exploration, philosophy and osteopathic practice of Robert C. Fulford, DO, this course builds on principles addressed in the basic course. More sensitive and potent concepts and techniques will be presented with supervised practice to assure a proper level of mastery during the course.

Dr. Fulford continued developing new techniques using the percussion hammer, which he pioneered, necessitating the development of an advanced course in the mid 1990s to allow participants to grasp the far-reaching osteopathic healing concepts that were the essence of the old doctor.

This is the same advanced course as taught by Dr. Fulford. An extra day has been added to allow greater study and practice into the thinking and practice of the modern-day osteopathic physician.

### Prerequisites

Attendees must have completed a 40-hour introductory cranial course approved by The Osteopathic Cranial Academy and the basic percussion course provided by Dr. Koss.

### Continuing Medical Education

22 credits of NMM-specific AOA Category 1-A CME anticipated.

### Course Times

Friday and Saturday from 8 a.m. to 6 p.m.
Sunday from 9 a.m. to 3 p.m.

### Meal Information

Breakfast will be provided Friday and Saturday. Lunch will be provided Friday through Sunday. Contact AAO Event Planner Gennie Watts with special dietary needs at (317) 879-1881, ext. 220, or EventPlanner@academyofosteopathy.org.

### Course Location

**University of North Texas Health Science Center**
**Texas College of Osteopathic Medicine**
3500 Camp Bowie Blvd., Fort Worth, TX 76107

### Travel Arrangements

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

### Course Director

When **Richard W. Koss, DO**, completed his undergraduate degree at Springfield College in Massachusetts, he planned to teach physical education, but an encounter with Bertha Miller, DO, changed his focus to osteopathic medicine.

In 1982, Dr. Koss graduated from what is now the A.T. Still University-Kirksville College of Osteopathic Medicine (ATSU-KCOM) in Missouri, after which he served in the U.S. Air Force Medical Corps for four years as a general medical officer, first at McChord Air Force Base near Tacoma, Washington, and then at Robins Air Force Base in Warner Robins, Georgia.

Dr. Koss first attended a percussion course taught by Robert C. Fulford, DO, in 1987 when Dr. Koss was a resident in osteopathic manipulative medicine at ATSU-KCOM. Two years later, Dr. Fulford invited Dr. Koss to be a table trainer for a percussion course. Dr. Koss continued to assist Dr. Fulford until the latter's death in 1997.

| Registration Fees | On or before Sept. 30 | Oct. 1 through Nov. 26 | On or after Nov. 27 |
|---|---|---|---|
| Academy member in practice* | $814 | $864 | $1,064 |
| Resident or intern member | $614 | $664 | $864 |
| Student member | $414 | $464 | $664 |
| Nonmember practicing DO or other health care professional | $1,014 | $1,064 | $1,264 |
| Nonmember resident or intern | $814 | $864 | $1,064 |
| Nonmember student | $614 | $664 | $864 |

** The AAO's associate members, international affiliates and supporter members are entitled to register at the same fees as full members.*

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## Registration Form

**Fulford's Advanced Percussion Hammer**
**Dec. 2-4, 2016**

❒ I have completed the prerequisites.

Name: _____ AOA No.: _____

Nickname for badge: _____

Street address: _____

_____

City: _____ State: _____ ZIP: _____

Phone: _____ Fax: _____

Email: _____

❒ I am a practicing health care professional.
❒ I am a resident or intern.
❒ I am an osteopathic or allopathic medical student.

The AAO accepts check, Visa, MasterCard and Discover payments in U.S. dollars. The AAO does not accept American Express.

Credit card No.: _____

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Expiration date: _____ 3-digit CVV No.: _____

Billing address (if different): _____

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

Signature: _____

Click here to view the **AAO's cancellation and refund policy.**

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**Register online at www.academyofosteopathy.org, or submit this registration form and your payment by email to EventPlanner@academyofosteopathy.org; by mail to the American Academy of Osteopathy, 3500 DePauw Blvd., Suite 1100, Indianapolis, IN 46268-1136; or by fax at (317) 879-0563.**

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unknown except as an abnormality in hydrocephalus. Here again occurs this thought of some vital element being distributed by the nerves to the periphery.

Few significant contributions to the knowledge of the central nervous system were forthcoming during the subsequent three hundred years. Then Galen in the second century A.D. made detailed studies of animal and human anatomy. He defined the dura and pia mater, the corpus callosum, the third and fourth ventricles, the Aqueduct of Sylvius, the fornix, the corpora quadrigemina, the vermiform process, calamus scriptorius, pineal body, hypophysis and infundibulum. He described all the cranial nerves with the exception of the fourth. However, he considered the abducens as part of the optic nerve, the facial and auditory as one, and the glossopharyngeal, vagus and spinal accessory as the sixth, thus making a total of seven cranial nerves. He was also a student of osteology and he left a clear description of the bones of the cranium. He enlarges upon, but did not significantly change the physiologic views of Erasistratus concerning the blood and its channels.

Fourteen hundred years elapsed before Charles Estienne described the canal in the spinal cord. (1530)

A century later (1662) Descartes described the brain as the "center of a nervous machine with a series of tubes radiating to all parts of the body carrying animal spirits to them which causes them to perform their normal physiological functions." The cerebro-spinal fluid was not yet recognized, but there was a dawning realization that the brain and nerves represented a vital part in the human economy.

A couple of years later in 1664, Thomas Willis published his famous work on the anatomy of the brain. The arterial Circle of Willis has immortalized his name which certainly was held in high regard during his lifetime too. The historian describes him as being "so infinitely resorted to for his practice that never any physician went beyond him or got more Money yearly than he." His description of the cerebral ventricles however, is picturesque and, for anatomists 300 years afterwards, is designed to provoke a smile. "Since," he writes, "they are only a vacuity resulting from the folding up of its exterior border, I see no reason we have to discourse much of their office, no more than astronomers are wont of the empty space contained within the vacuity of the sphere." Astronomers too have changed their views on the significance of space!

Antonio Valsalva, whose name is remembered for his remarkable anatomical, physiological and pathological observations concerning the ear, provided in 1692 the first unequivocal description of a liquid present around the neuraxis of a healthy animal. He said that on opening the spinal canal of a dog, he saw a liquid which in all its aspects, resembles that found in joints. But this observation went completely unnoticed until modern times.[7]

In 1764, a professor of anatomy at Naples University by the name of Antonio Cotugno provided another clear description of the cerebro-spinal fluid. Not only did he realize that the fluid was to be found in free communication in the cranial and spinal cavities, but he measured the quantity and found it to be 4-5 ounces. He explained that earlier anatomists had failed to find the fluid because decapitation was customarily performed before dissection, thus allowing the fluid to run out from both cranial and spinal cavities.

Modern studies of the cerebro-spinal fluid, however, began with the work of the French anatomist and physiologist Francois Magendie during the first half of the 19th century. He believed he had discovered it for the first time. He named it, and he initiated investigations of the fluid in normal and pathological states. The classic work of Key and Retzius (1875) provides the basis for the modern concepts of the meninges and the spaces in which the cerebro-spinal fluid is contained.

In 1887, Bevan Lewis expressed a concept of especial interest to this discussion, as reported in the Proceedings of the Royal Society. The subject was the "Relationship of the Nerve Cells of the Cortex to the Lymphatic System of the Brain." He described the cerebro-spinal fluid as the pericellular secretion into lymph clefts, which also communicates with the subarachnoid spaces. It is expressed, he points out, in alternate periods into the spaces around the medullary fibers which are continuous with the same spaces in the peripheral cranial and spinal nerves. It is moved by the systole and diastole of the brain in rhythm with the lungs on inspiration and expiration.

Key and Retzius also supported the view that on inspiration and expiration of the lungs, the various parts of the cerebrum and cerebellum contract and expand, distributing the fluids secreted therein at different times and over different paths,

Another 50 years was to elapse before Harvey Cushing, Professor of Surgery at Johns Hopkins, presented the conclusions of his deliberations on this fascinating subject.

In 1925, Cushing devoted the first of three Cameron Lectures in the University of Edinburgh to the topic of "The Third Circulation and its Channels."[8] He was discussing the cerebro-spinal fluid "which," he said, "proves to be in continual movement, in a definite direction, through a highly specialized pathway, that cuts across the

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blood circle to envelop an organ in which a lymphatic apparatus of the usual type does not exist." This lecture is a masterpiece of pertinent observation, lucid description and logical deduction, and I would commend it to your study. He referred to the illuminating studies of Dr. Lewis H. Weed at Boston, who was a colleague of his, which served to show with some finality:

> that at about the 5th week of embryonic life, fluid begins to percolate through the remaining fragment of the roof plate overlying the 4th ventricle; that it finds its way through leptomeningeal channels which are thereby formed in the mesenchyme; and finally that it escapes by way of persisting leptomeningeal communications, the villi, that projects through the dura into its major venous sinuses. All of which assuredly indicated the birth of an actual circulation under the pressure of a secretion.

"Now it is a remarkable thing," Dr. Cushing says, "if one stops to think of it that Nature should have provided this watery fluid which on the general biophysical principle of diffusion contains the salts and sugars of the blood, but practically none of its other elements." He poses the question, "what could have been her reason for interposing in the blood stream this peculiar circulatory switch with its choroidal barriers and impervious pia, which keeps the fluid free from practically all known substances, whether drugs or vital dyes which may be put into the blood stream." His answer was that "unquestionably one purpose was to provide a medium for the washing out of products of metabolism—a substitute for a lymphatic apparatus if you will—for we have learned that the intraventricular and subarachnoid fluids have a slightly different chemical composition. Then too, it seems not improbable that something may be added to the fluid in transit which may be necessary to the economy."

**"Still dwelt at great length on the importance of a free circulation of healthy blood in the production and maintenance of health.**

## Contemporary Osteopathy

Twenty-five years later, the electron microscope revealed an anatomical fact of great significance to the further understanding of the cerebro-spinal fluid system. Wyckoff and Kennedy demonstrated that the collagen fibrils of the connective tissues are not solid structures as heretofore believed but are in fact tubular.[9]

This tubular structure is common to all collagen, and its occurrence is ubiquitous. Ligaments, tendons, aponeuroses, sheath, bones, blood vessels, the connective tissue elements of the peripheral nervous system and of the muscles, the meninges and their reflections all contain collagen, thus providing a vast tubular system in continuity throughout the organism.

This was first reported publicly in 1952. Two hundred years before this in 1746, Dr. Piegm is reported by Vaillard as providing the two-fold motion of the brain, pulsatile and expansile and also demonstrated by his experiments that movements analogous to those of the brain exist in the extremities and every other part of the body.[10]

The recognition of the contractility of the connective tissue oligodendroglial cells of the central nervous system by Woolley and Shaw in 1957 provided another important link in the development of the concept of a cerebro-spinal fluid system.

Finally, the apparently unrelated work by Pritchard and his associates in the University of Dublin on the structure and development of cranial and facial sutures, published in 1956,[11] provides corroboration for the accommodative motion of the skull to this cerebrospinal fluid system.

From the gropings of the scientists of antiquity through the astute observations and deductions of anatomists and physiologists through the centuries to the penetration of the ultramicroscopic realm by the mechanized physiologists of this age, there has emerged a concept, the significance of which is only just beginning to dawn. Let us now return to the work of Still and Sutherland.

Still dwelt at great length on the importance of a free circulation of healthy blood in the production and maintenance of health, but he also recognized that in some instances, a disabled limb, for example, does obtain blood abundantly to and from the heart, but the results obtained are not satisfactory. "What quality and element of force and vitality," he questioned in 1889, "has been withheld?" A thought struck him that "the cerebro-spinal fluid is the highest known element that is contained in the human body, and unless the brain furnishes this fluid in abundance, a disabled condition of body will remain."[12]

Then came Sutherland, who brought forth a complete picture of the function of the cerebro-spinal fluid system. Let us travel with

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him on this journey of exploration. In 1931, in one of his earliest published writings[13] on this subject he stated,

> The sutures of the cranial vault do not complete ossify until life departs. Animate skulls possess a potent life force that promotes normal membranous articular expansion and contraction at the dovetail sutures of the vault, unlike the inanimate skull. Even the trunk of the mighty oak possesses a certain degree of flexibility until it becomes a sapless log … The dovetail sutures were not designed for separation but *to protect from separation* while, at the same time affording articular expansion and contraction to accommodate mobility at other articulations of the cranial and facial bones.

It was in 1956 that the anatomists Pritchard et al made their pronouncement that "from their mode of development and their histological organization, sutures form a strong bond of union between adjacent bones while permitting slight movements."[11] Sutherland described in detail the specific motions of the various bones, and he used such vivid, picturesque language that the type and purpose of the motion becomes immediately apparent. Just one example will be cited here:

> The ethmoid breathes. A little bone, yet having articular relationship with thirteen others. Why? It might be the 'bell sheep' of the entire flock of cranial and facial bones, leading them in membraneous articular mobility. It could be the 'air propeller' that lifts the sphenoid. The sphenoid bone, with its greater and lesser wings can be called the 'airship.' Its front end ascends during expiration and takes a 'nose dive' in association with inspiration. In relation therewith, the superior and middle turbinares of the ethmoid swing bell-like anteriorly as the 'ship' ascends and posteriorly during the 'nose dive.' In the meantime, the falx cerebri, acting in the capacity of the 'bell-rope' through its attachment at the crista galli functionally co-operates in the bell-like movement. As the front end ascends, the rear end descends thus assisting in the undulatory-rotary articular mobility of the petrous-basilar articulations. The tentorium cerebelli, having attachment to the clinoid processes, provides a functional co-operation with the falx cerebri.

And so he continues to paint a vivid motion picture of the physiological motion of the whole cranial mechanism.

The question which logically arose from this observation was "through what intermediate, propellant agency does cranial articular mobility derive its activity?" In 1933, Sutherland presented this answer.[14] "The brain is alive with incite-motor potentiality and has subsequent activity in its ventricles and convolutions; it moves and has its being within the skull." The observation of the contractility of the connective tissue cells of the central nervous system is a pertinent corollary to this. "It can," he continues, "by its own incite-motor potentiality and subsequent activity of the ventricles and convolutions, incite cranial articular mobility by way of the intermediate propellant—tension agency of the pial, arachnoid and dural membranes." He concludes "the falx cerebri and the tentorium cerebelli, especially function as intermedial, propellant—tension bands between the convolutions and the articulations as well as balance—reciprocants in the equalization of articular mobility." The articular activity of the cranial bowl was soon linked to that of the pelvic bowl, thus. The intraspinal membranes that surround the spinal cord, having attachment above to the foramen magnum and the upper three cervical vertebrae, and below to the second sacral segment act as a reciprocal tension tissue that links and regulates the cranial articular mechanism with the pelvic articular mechanism, the two functioning in unison during the respiratory periods.[15]

This membranous tension system was later named the reciprocal tension membrane, which included the falx cerebri, and cerebelli, the tentoria cerebelli, the diaphragma sellae, and the spinal dura, all functioning as a unit.

> **"Sutherland left behind the key to the solution of numerous clinical problems ... for he applied the principles of health and disease enunciated by Still to the whole man.**

The cerebro-spinal fluid, the fourth part of the primary respiratory mechanism has a profound and complex part to play. In an early communication, Sutherland stated, "mechanically in its fluctuation it acts somewhat like an hydraulic brake system and locks the movement of the brain, a part of the power mechanism of primary respiration." Furthermore, it is the normal fluctuation of the cerebro-spinal fluid that is back of all the changes in the ingredients. The changes affect the nuclei secondarily. "The circulatory activity of the cerebro-spinal fluid," he maintained, "is primary to the arterial, venous and lymphatic activity." He postulated furthermore, the peripheral influence of the cerebro-spinal fluid and its profound therapeutic effect on disturbed physiology wherever it may be

*(continued on page 30)*

*Standing the test of time*
*(continued from page 29)*

encountered. The tubular structure of the collagen fibrils, providing a fluid pathway from the subarachnoid space to every organ, every bone and to the periphery provides an anatomical basis for such an hypothesis.

Sutherland's concept then, was a picture of a motile central nervous system, moving involuntarily and rhythmically within the skull, a rhythmical dilatation and contraction of the ventricles, and a shortening and lengthening of the spinal cord. This ventricular dilatation and contraction in turn affects the cerebro-spinal fluid circulatory activity; and the circulatory activity affects movement of the arachnoid and dural membranes; and through the special reciprocal tension membrane affects mobility in the basal articulations of the skull.[16]

But Sutherland did more than provide a careful observation of anatomic and physiologic phenomena and formulate an hypothesis of function which related sciences are subsequently substantiating. This in itself would have been a monumental contribution to the knowledge of the human organism. But he left behind the key to the solution of numerous clinical problems which the physician meets many times a day, for he applied the principles of health and disease enunciated by Still, to the whole man including his head. The interrelationship of structure and function is as important in the cranium as it is in other parts of the body. Furthermore he demonstrated the potency of the cerebro-spinal fluid as a therapeutic agent whose influence may be exerted to assist the restoration of health in a limb, in an organ, in the structural integrity, in the functional efficiency of any part of the whole man.

## Sutherland's Legacy

Sutherland was a man of humility and dignity who walked in fellowship with his Creator. To him, his contribution was but a development of Still's concept and practice of osteopathy. After 50 years of practice and study, Sutherland wrote, "We have only scratched the surface of what Dr. Still saw in the Science of Osteopathy." This concept of health and disease, then, which has placed the head on the body and endowed it with its true authority in the total mechanism is in fact the work of Sutherland founded upon and evolving out of the principles and practice of Still. It may be said of Sutherland as of the Everest conqueror Hillary, "this final accomplishment was but the climax to a story which had already been lived and written in large part before this expedition set out."

It is nearly 3,000 years since the Greeks moved the center of intelligence from the heart to the brain amidst much controversy; yet no man today would question this concept. It is little more than 30 years since Sutherland first taught the supreme role of the cerebro-spinal fluid in establishing and maintaining the functional efficiency of the whole man. This concept too must meet controversy before it will be accepted fact. But for him who will cultivate the perceptive instrument in his hands and his fingers, verification is at hand. To him who cannot develop such a diagnostic instrument, the proof accorded by relatively clumsy electronic equipment will come a little more slowly. But despite the machinations of politicians and the crystallization of physicians, this concept will live and grow until the day will dawn when it is universally accepted the "the role of the artery is supreme but the cerebro-spinal fluid is in command."

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# Osteopathic Management of Chronic Pain:
## Addressing Chronic Fatigue Syndrome, Fibromyalgia, Multiple Sclerosis and Neuroinflammation

**Jan. 20-22, 2017 • Midwestern University/Arizona College of Osteopathic Medicine in Glendale**

A growing number of people are diagnosed with chronic fatigue syndrome, fibromyalgia and other chronic pain conditions. These patients need effective, noninvasive treatments that don't aggravate their conditions. This course will provide participants the tools to recognize these conditions and their symptoms and to treat those patients.

The principal treatment will be a blend of Dr. Chikly's lymph and brain techniques. The lymph techniques will include superficial and deeper lymph, mapping and rerouting techniques and some specific viscera work using a lympho-fascia release approach to viscera. The brain techniques will include brainstem, pons, mesencephalon, etc. Specific sacrum intra- or inter-osseous techniques also will be presented.

By the end of the course, participants will be able to identify several chronic pain conditions; describe the comorbidity, known causes, and differential diagnoses of these conditions; explain the importance of the lymphatic system in addressing these conditions; identify megalymphatics in the thorax; and perform lymphatic techniques to release the liver, spleen and small intestines.

### Continuing Medical Education
24 credits of NMM-specific AOA Category 1-A CME anticipated.

### Course Times
Friday through Sunday from 8 a.m. to 6 p.m.

### Meal Information
Breakfast and lunch will be provided each day. Contact AAO Event Planner Gennie Watts with special dietary needs at (317) 879-1881, ext. 220, or EventPlanner@academyofosteopathy.org.

### Course Location
**Midwestern University/Arizona College of Osteopathic Medicine**
Agave Hall, OMT Lab 101
19555 N. 59th Ave., Glendale, AZ 85308

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

### Course Director


**Bruno J. Chikly, MD, DO (France)**, is a graduate of the medical school at St. Antoine Hospital in Paris, where his internship in general medicine included training in endocrinology, surgery, neurology and psychiatry. Dr. Chikly also has the French equivalent of a master's degree in psychology. He received an honorary DO degree from the European School of Osteopathy in Maidstone, Kent, in the United Kingdom and a PhD in osteopathy from the Royal University Libre of Brussels in Belgium.

Dr. Chikly is an international renowned educator, lecturer and writer. He is the author of the book *Silent Waves: The Theory and Practice of Lymph Drainage Therapy,* as well as the creator of a DVD titled *Dissection of the Brain and Spinal Cord*, and he is working on a book about osteopathic manipulation and the brain. He lives in Scottsdale, Arizona, with his wife and partner, Alaya.

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***Orthotics and low back pain***
***(continued from page 11)***

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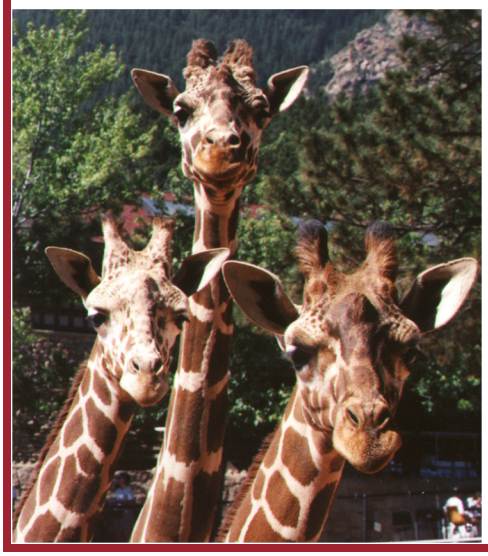

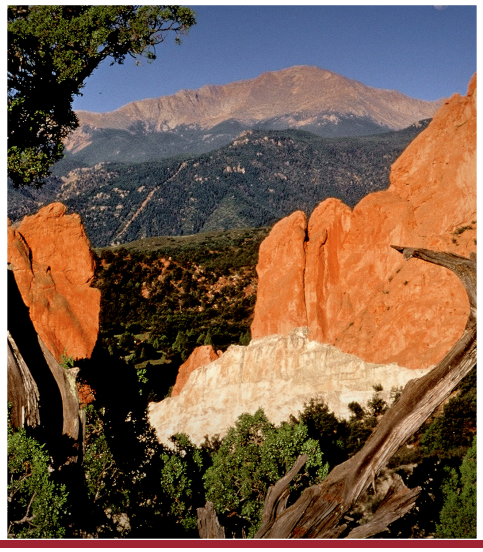

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***Introduction to the Fascial Distortion Model, Module 1***
Course director: Todd A. Capistrant, DO, MHA
Michigan State University College of Osteopathic Medicine
East Lansing
20 credits of AOA Category 1-A CME anticipated
Learn more or register at www.afdma.com.

**June 9-13, 2016**
Sutherland Cranial Teaching Foundation
***Osteopathy in the Cranial Field***
Course director: Daniel B. Moore, DO
Marian University College of Osteopathic Medicine
Indianapolis
40 credits of AOA Category 1-A CME anticipated
Learn more and register at www.sctf.com.

**June 11-15, 2016**
The Osteopathic Cranial Academy
***Summer introductory course: Osteopathy in the Cranial Field***
Course director: Eric J. Dolgin, DO, FCA
Crowne Plaza Hotel, Redondo Beach, California
40 credits of AOA Category 1-A CME anticipated
Learn more and register at www.cranialacademy.org.

**June 16-19, 2016**
The Osteopathic Cranial Academy
***Annual conference—Our Triune Nature: Approaches Supporting the Health***
Course directors: J. Yusuf Q. Erskine, DO, and Tudor Marinescu, MD
Crowne Plaza Hotel, Redondo Beach, California
22 credits of AOA Category 1-A CME anticipated
Learn more and register at www.cranialacademy.org.

**June 24-28, 2016**
Michigan State University College of Osteopathic Medicine
***Craniosacral Techniques: Part III***
Course director: Barbara Briner, DO
East Lansing, Michigan
35 credits of AOA Category 1-A CME anticipated
Learn more and register at com.msu.edu

**July 14-18, 2016**
American Fascial Distortion Model Association
***FDM Scientific Conference and Pelvic Pain Advanced Seminar***
Course director: Todd A. Capistrant, DO, MHA
Wedgewood Resort in Fairbanks, Alaska
6 credits of AOA Category 1-A CME anticipated
Learn more or register at www.afdma.com.

**July 15-17, 2016**
Rocky Mountain Academy of Osteopathy
***OMM and the CNS***
Course directors: Teodor Huzij, DO, FACN, and R. Paul Lee, DO, FAAO, FCA
Rocky Vista University College of Osteopathic Medicine
Parker, Colorado
20 credits of AOA Category 1-A CME anticipated
Learn more and register at rockymountainaao.wix.com/rockymtnaao.

**July 27-31, 2016**
Osteopathy's Promise to Children
***Foundations for Osteopathic Cranial Manipulative Medicine***
Course director: R. Mitchell Hiserote, DO
Osteopathic Center, San Diego
40 credits of AOA Category 1-A CME anticipated
Learn more and register at www.the-promise.org.

**Aug. 19-21, 2016**
Osteopathy's Promise to Children
***Intensive Course in Pediatric Osteopathy***
Course director: Shawn Kristian Centers, DO, MH, FACOP
Osteopathic Center, San Diego
24 credits of AOA Category 1-A CME anticipated
Learn more and register at www.the-promise.org.

**Sept. 9-11, 2016**
Michigan State University College of Osteopathic Medicine
***Integrated Neuromuscular and Myofascial Release***
Course director: Lisa Ann DeStefano, DO
Program faculty: Katie Stephens, PT
East Lansing, Michigan
19 credits of AOA Category 1-A CME anticipated
Learn more and register at com.msu.edu.

**Sept. 16-18, 2016**
The Osteopathic Cranial Academy
***Orofacial Development: Merging OCF and Functional Dentistry***
Course director: Eric J. Dolgin, DO, FCA
Hilton Irvine Hotel in California
22.5 credits of AOA Category 1-A CME anticipated
Learn more and register at www.cranialacademy.org.

**Sept. 30–Oct. 4, 2016**
Michigan State University College of Osteopathic Medicine
***Craniosacral Techniques: Part II***
Course director: Barbara Briner, DO
East Lansing, Michigan
35 credits of AOA Category 1-A CME anticipated
Learn more and register at com.msu.edu.

**Visit www.academyofosteopathy.org for additional listings.**