Tradition Shapes the Future

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The American Academy of Osteopathy is your voice...

in teaching, promoting, and researching the science, art, and philosophy of osteopathic medicine, with the goal of integrating osteopathic principles and osteopathic manipulative treatment in patient care.

If you are not already a member of the American Academy of Osteopathy (AAO), the AAO Membership Committee invites you to join the Academy as a 2017-18 member. The AAO is your professional organization. It fosters the core principles that led you to become a doctor of osteopathic medicine.

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Your membership dues provide you with:

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• the fellow designation of FAAO, which recognizes DOs for promoting OMM through teaching, writing, and professional service and which is the only earned fellowship in the osteopathic medical profession.
• promotion and grant support of research on the efficacy of OMM.
• support for the future of the profession through the Student American Academy of Osteopathy, the National Undergraduate Fellows Association, and the Postgraduate American Academy of Osteopathy.

If you have any questions regarding membership or membership renewal, contact Bev Searcy, the AAO’s finance and membership assistant, at BSearcy@academyofosteopathy.org or at (317) 879-1881, ext. 212.

AAOJ Call for Submissions

Time is precious and article writing is often triaged for busy physicians. In an effort to help guide the journal and stimulate interest in academic and scholarly activity, we are providing some broad topics that can be “reserved” for you. These are by no means the only topics for the journal, but it helps to eliminate the writer’s block that so many of us may face.

Below are the topics available to reserve if you would like to support your portfolio with academic writing:

• Osteopathic approaches to treating patients with pelvic dysfunctions
• Osteopathic approaches for the cardiac patient
• The body triune: osteopathic treatment of mind and spirit for today’s patient
• Beyond Spencer technique: OMT for shoulder overuse
• Using OMT to treat patients with long-term side effects of radiation for cancer treatment

If you have interest in any of these topics, send an email to Lauren Good and reserve your topic today. Manuscripts should be emailed to editoraaoj@gmail.com within three months of reserving a topic. See the AAOJ’s Instructions for Contributors for more information on submitting manuscripts.

In addition, we are asking for peer reviewers to assist us in producing the best journals we can, so please contact AAO Communications Specialist Lauren Good at LGood@academyofosteopathy.org if you can help in this capacity. No experience is required, and training resources will be provided. Peer reviewers are expected to review at least two manuscripts per year.

If you have any questions, please email us at editoraaoj@gmail.com.
Manuscript Submission

- Submission emailed to editoraaoj@gmail.com or mailed on a flash drive or CD to the AAOJ managing editor, American Academy of Osteopathy, 3500 DePauw Blvd, Suite 1100, Indianapolis, IN 46268-1136

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

Manuscript Components

- Cover letter addressed to the AAOJ’s editor-in-chief with any special requests (eg, rapid review) noted and justified

- Title page, including the authors’ full names, financial and other affiliations, and disclosure of financial support related to the original research or other scholarly endeavor described in the manuscript

- “Abstract” (see “Abstract” section in “AAOJ Instructions for Contributors” for additional information)

- “Methods” section
  - the name of the public registry in which the trial is listed, if applicable
  - ethical standards, therapeutic agents or devices, and statistical methods defined

- Four multiple-choice questions for the continuing medical education quiz and brief discussions of the correct answers

- Editorial conventions adhered to
  - terms related to osteopathic medicine used in accordance with the Glossary of Osteopathic Terminology
  - units of measure given with all laboratory values
  - on first mention, all abbreviations other than measurements placed in parentheses after the full names of the terms, as in “American Academy of Osteopathy (AAO)”

- Numbered references, tables, and figures cited sequentially in the text
  - journal articles and other material cited in the “References” section follow the guidelines described in the most current edition of the AMA Manual of Style: A Guide for Authors and Editors
  - references include direct, open-access URLs to posted, full-text versions of the documents, preferably to digital object identifiers (DOIs) or to the original sources
  - photocopies provided for referenced documents not accessible through URLs

- “Acknowledgments” section with a concise, comprehensive list of the contributions made by individuals who do not merit authorship credit, as well as permission from each individual to be named

- For manuscripts based on survey data, a copy of the original validated survey and cover letter

Graphic Elements

- Graphics formatted as specified in the “Graphic Elements” section of “AAOJ Instructions for Contributors”

- Graphics as separate graphic files (eg, jpg, tiff, pdf)

- Each graphic element cited in numerical order (eg, Table 1, Table 2 and Figure 1, Figure 2) with corresponding numerical captions provided in the manuscript

- For reprinted or adapted tables, figures, and illustrations, a full bibliographic citation given, providing appropriate attribution

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- For photographs in which patients are featured, signed and dated patient-model release forms

- For named sources of unpublished data and individuals listed in the “Acknowledgments” section, written permission to publish their names in the AAOJ

- For authors serving in the US military, the armed forces’ written approval of the manuscript, as well as military or other institutional disclaimers

Financial Disclosure and Conflict of Interest

Authors are required to disclose all financial and nonfinancial relationships related to the submission’s subject matter. All disclosures should be included in the manuscript’s title page. See the “Title Page” section of “AAOJ Instructions to Contributors” for examples of relationships and affiliations that must be disclosed. Those authors who have no financial or other relationships to disclose must indicate that on the manuscript’s title page (eg, “Dr Jones has no conflict of interest or financial disclosure relevant to the topic of the submitted manuscript”).

Publication in the JAOA

Please include permission to forward the manuscript to The Journal of the American Osteopathic Association if the AAOJ’s editor-in-chief determines that the manuscript would likely benefit osteopathic medicine more if the JAOA agreed to publish it.

Questions? Contact editoraaoj@gmail.com.
People do bad things all the time, but when that person shares your profession, how do you respond? We as a community are trying to pick up the pieces, to regain composure after the news of Larry Nassar and his actions. He was an osteopathic physician who violated the osteopathic oath. He lost his way, and in the process, he lost his empathy and his boundaries. He did so and called it OMT—and the end result will forever change what we do. There is a stain in the fabric of the profession that just won’t come out no matter how hard we try. We will recover, and the next sensational story will cover the footprint this one has left on our profession and our hearts. When it does, we will move on, keep the torch burning and ask ourselves, "What about me? Is there some part of me that has lost my way, or lost my boundaries even in the slightest? Have I forgotten that there is a patient on my table, with a history, with feelings, with past experiences that may color what is happening to them or what I am doing to help them? What am I doing to protect their boundaries and my own?"

I love this profession, and I love the fact that we have meaningful therapeutic contact with our patients. I personally made the assumption that the patient gave implicit consent for treatment when they landed in my office and on my treatment table. As a profession, we need to rethink what “consent” means. The #MeToo movement is not going away, nor should it. Silenced for years, this movement is now finding its voice. That voice includes calling out what is perceived as harmful contact in spite of the intention to help. Without clear boundaries, we as a profession may find ourselves in the crossfire of a movement indignant with the abuses that have been hidden for years.

This indignation is finding its way in to the media as well, in the form of sensationalism such as the Los Angeles Times' op-ed article that stirred up ire in the profession. People are angry, and that anger toward one person’s horrific actions is spilling over to affect all in the profession he shared. Media and opinion have become a battlefield we physicians need to navigate so we don’t accidentally step on a landmine and blow ourselves into court.

Osteopathic physicians have, by their very nature, received information through touch. Indeed, perceptual transference is a way to diagnose the patient. Have we reached a tipping point in our society, however, where touch itself can no longer be trusted, no matter who is delivering it? Is consent needed each and every time we touch the patient? Are we asking that consent? Boundaries, both professional and personal, are required from each and every one of us to move forward, make peace and shed light to the darkest corners of the profession. In picking up the pieces and beginning the healing process, I am hopeful that each and every person in this profession will take the time to remember the intention to “first do no harm,” take an inventory of boundaries, both personal and professional, and begin to see OMT as the procedure it is.

In service,

Janice Upton Blumer, DO, FAAO
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<td>March 18-20</td>
<td>Pre-Convocation course—Introduction to the Fascial Distortion Model—Todd A. Capistrant, DO, MHA, course director—Hilton Anatole in Dallas</td>
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<td>AAO Education Committee's meeting—6:30 to 8 a.m. Central—Hilton Anatole in Dallas</td>
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<td>March 18-20</td>
<td>Pre-Convocation course—Osteopathic Management of Chronic Fatigue Syndrome, Fibromyalgia and Multiple Sclerosis—Bruno Chikly, MD, DO (France), course director—Hilton Anatole in Dallas</td>
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<td>PAAAO annual business meeting and luncheon—12:30 to 2:30 p.m. Central—Hilton Anatole in Dallas</td>
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<td>March 18-20</td>
<td>Pre-Convocation course—The Twig Unbent: An Osteopathic Approach to Common Orthopedic Problems in Children—Heather P. Ferrill, DO, MS MEdL, and Lisa Ann DeStefano, DO, course directors—Hilton Anatole in Dallas</td>
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<td>March 23</td>
<td>AAO Osteopathic Education Service Committee's meeting—12:30 to 2:30 p.m. Central—Hilton Anatole in Dallas</td>
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<td>March 23</td>
<td>AAO Postdoctoral Training Committee’s meeting—3:30 to 5 p.m. Central—Hilton Anatole in Dallas</td>
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<td>Committee on Fellowship in the AAO’s interviews and meeting—8 a.m. to 5 p.m. Central—Hilton Anatole in Dallas</td>
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<td>AAO International Affairs Advisory Council’s meeting—6:30 to 8 a.m. Central—Hilton Anatole in Dallas</td>
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<td>AAO Board of Trustees’ meeting—6 to 9 p.m. Central—Hilton Anatole in Dallas</td>
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<td>AAO Student Academies Committee’s meeting—6:30 to 8 a.m. Central—Hilton Anatole in Dallas</td>
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<td>AAO Board of Governors’ meeting—2 to 5 p.m. Central—Hilton Anatole in Dallas</td>
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<td>Post-Convocation course—Residency Program Directors Workshop—Stephen I. Goldman, DO, FAAO, FAOASM, course director—Hilton Anatole in Dallas</td>
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<td>March 21</td>
<td>AAO Investment Committee’s meeting—5 to 6 p.m. Central—Hilton Anatole in Dallas</td>
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<td>March 22</td>
<td>AAO annual business meeting and luncheon—11:45 a.m. to 2:15 p.m. Central—Hilton Anatole in Dallas</td>
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<td>June 7-9</td>
<td>Prolotherapy and Platelet-Rich Plasma—Mark S. Cantieri, DO, FAAO, and George J. Pasquarello, DO, FAAO, course directors—Marian University College of Osteopathic Medicine in Indianapolis</td>
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<td>March 23</td>
<td>AAO Louisa Burns Osteopathic Research Committee’s meeting—6:30 to 8 a.m. Central—Hilton Anatole in Dallas</td>
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Like many of you, I have watched the coverage of the Larry Nassar abuse case with growing horror. Nassar molested patients and told them it was osteopathic manipulative treatment (OMT). Every physician knows it wasn’t. There was nothing medically accepted about his criminal acts. The crimes Nassar committed in the name of osteopathic medicine bore no resemblance to the techniques so many of us use every day to provide relief to patients.

Sadly, Nassar’s notoriety may make it that much harder for us to convince the public of the legitimacy of osteopathic manipulative medicine (OMM) and OMT. It is incumbent on all of us to ensure Nassar’s legacy is not the legacy to define OMM. We must be the voice to advocate for our patients and our profession. Talk to your family, your friends, your colleagues—even strangers on the internet—about what makes OMM/OMT a healthy and viable alternative to opioids and how OMT, practiced responsibly, can benefit patients in pain and improve outcomes in multiple clinical conditions.

It is imperative that we educate other health care professionals, the public and our profession on the benefits of OMM/OMT.

The AAO, under the leadership of 2016-17 President Laura E. Griffin, DO, FAAO, and the AAO Board of Governors, developed a position paper of the “Recommended Guidelines for Examination and Treatment of the Pelvis and Related Areas.” The AAO submitted Resolution H-336 to the American Osteopathic Association’s House of Delegates in July 2017 for consideration as “Recommended Guidelines for Pelvic Examination and Treatment.” After much discussion in subcommittees with the AOA Board of Trustees and House of Delegates, the recommendation was for the resolution to return to the AAO for the document to be refined and resubmitted.

The subcommittee discussions became an opportunity for the AAO to clarify why this guideline was introduced as a resolution in response to some confusion. It was apparent that the different groups did not realize that until the AAO developed a position paper, there was no comprehensive document by an osteopathic organization that addressed the appropriate application of OMT in treating conditions of the pelvic region. The AAO is working with multiple osteopathic specialty colleges to have a position paper for the profession to approve by the AOA House of Delegates in July 2018.

Adding insult to injury, many of you are aware that there was an op-ed piece in the Los Angeles Times on January 26, 2018, by Virginia Heffernan that presented a negative view of the osteopathic profession. Ms. Heffernan recommended that the public view osteopathic physicians and those that utilize OMM/OMT as criminals. The osteopathic approach was deemed to represent quackery. All of this was due to the acts of one individual. The AOA is responding to this, but one letter has been sent to the Los Angeles Times editor-in-chief by one of our respected members, Kristine M. Rivera, DO. Dr. Rivera was kind enough to allow us to share her letter to Ms. Heffernan. Dr. Rivera’s response to reckless reporting was done in the most accurate and eloquent fashion.

It is important to understand that the AAO was responding to the Nassar case in an appropriate time frame. The initial response had to be from the AOA to ensure a consistent message to denounce Nassar for the damage done to innocent girls and women. Below is a statement about the case that was emailed to all Academy members on Wednesday, January 31. It also was posted on the AAO’s website and shared on social media. I encourage all Academy members to engage with the AAO on social media, liking, commenting...
and sharing posts to spread the word about the benefits of osteopathic medicine in general and OMT in particular.

**AAO Response Regarding Larry Nassar**

Osteopathic physicians are trained to utilize osteopathic manipulative treatment (OMT) in the care of their patients. OMT offers an effective and nonpharmacologic option to treat a wide range of conditions, from common musculoskeletal disorders, such as low back and neck pain, to improving outcomes for elderly hospitalized patients admitted for pneumonia. OMT is a valuable tool for the health and well-being of patients who receive it. In the midst of an opioid crisis, there is a need for additional nonpharmacological treatment methods such as OMT to assist patients suffering from acute and chronic pain.

It is disheartening when a valuable treatment option for patient care is not used in an appropriate manner. It is reprehensible that a predator hid behind the guise of OMT to prey on young girls and women. Mark Baker, DO, the president of the American Osteopathic Association, expressed the same emotion that many of us share after hearing the stories of abuse to over 150 female patients. These brave girls and women have publicly described in detail what should never happen to a patient under the trusted care of any health care provider.

The abuse perpetrated by Larry Nassar violates every acceptable practice of osteopathic physicians everywhere. Such actions were counter to the Osteopathic Oath every osteopathic physician is committed to:

I will be mindful always of my great responsibility to preserve the health and the life of my patients, to retain their confidence and respect both as a physician and a friend who will guard their secrets with scrupulous honor and fidelity, to perform faithfully my professional duties, to employ only those recognized methods of treatment consistent with good judgment and with my skill and ability, keeping in mind always nature's laws and the body's inherent capacity for recovery.

The egregious actions of one individual should not deter efforts to encourage the appropriate application of osteopathic concepts in the treatment of patients. Caring for patients is the greatest of privileges. We join Dr. Baker in honoring these victims by doing all we can to ensure OMT is provided to patients in need in the most appropriate and professional way possible, by continuing to educate the public on our proud profession and all it has to offer, and by ensuring that, collectively and individually, we are vigilant in safeguarding our patients.

In service,

Michael P. Rowane, DO, MS, FAAFP, FAAO
2017-18 AAO President
New Clinical Applications for Treating the Thoracic Inlet

Indirect myofascial release
G. Bradley Klock, DO, FAAO, has a manuscript in development which details an indirect myofascial approach to treating strain patterns involving the upper thorax and shoulder girdle. The process involves identification and systematic correction of common dysfunctions and individual muscle strains that influence the inlet. It is his belief that a more lasting inlet correction is possible by treatment which addresses problems involving these areas first and subsequent correction of each individual component of inlet dysfunction (G. Bradley Klock, DO, FAAO, e-mail communication, May 12, 2015).

Muscle energy for the thoracic inlet fascial pattern utilizing the shoulder girdle
As has been noted above (see Part 1), Zink’s lymphatic approach with OMT places significant focus on major fascial patterns of the body’s transitional regions. It therefore seems appropriate that a technique would be developed which engages the thoracic inlet somatic dysfunction from a broader fascial pattern approach. José S. Figueroa, DO, FAOCPPMR, FAAPMR, published an article in The AAO Journal that details a muscle energy approach utilizing the entire shoulder girdle for correction of each of the components of the thoracic inlet.

A New Indirect Myofascial Technique Utilizing Still Principles for the Thoracic Inlet
This new approach is both safe and efficient, and it overlaps with the positioning employed in Zink’s common compensatory evaluation of the thoracic inlet. The patient is evaluated in the supine position with the physician at the head of the table. Sidebending and rotational components of the thoracic inlet are assessed in the typical manner (Figures 2 and 3, page 10).

Treating the thoracic inlet, sidebent right, rotated right (S<sub>R</sub> R<sub>R</sub>)
1. The patient is supine.
2. The physician is seated at the head of the table.
3. Hand contact during the technique is very similar to the placement for diagnosing the sidebending component (Figures 3 and 4, page 10).
4. For a patient with a diagnosis of sidebent right, rotated right, gentle pressure is applied inferiorly to the side of sidebending with the physician’s entire right hand in a lobster-claw type position, with the thumb placed on the superior aspect of the first rib and 4 fingers posteriorly over the dorsal rib cage. At the same time, the left hand grasps the tissues on the left shoulder girdle.
5. The indirect position is then exaggerated with compression toward the feet on the side of sidebending and further rotation toward the right until a gentle release is appreciated.

6. While maintaining compression, the physician’s hands move the tissues in a bicycle-pedal fashion simultaneously back through direct positioning and ending in neutral (Figure 5, page 11).

a. The right-hand motions appear to move in a clockwise direction if viewed from the right side of the table. Initially the tissues are taken from an inferior-posterior to superior-posterior to superior-anterior position then back to neutral.

b. The left-hand motion also moves in a bicycle-pedal fashion; however, viewed from the left side of the table, it is a counterclockwise direction.

7. Release the compression once tissues are brought to neutral.

8. Maintain hand placement on tissues to re-evaluate sidebending, then re-evaluate rotation.

### Applying the technique

When considering the more established approaches for treating the thoracic inlet, there are patients with conditions that preclude particular techniques. This new application of Still technique principles presents a safe, efficient, and effective treatment approach for patients who have a variety of challenging conditions.

### Safety

Manipulative forces applied during the technique are relatively gentle and of moderate amplitude, initially bringing the tissues into the direction of ease, then moving one’s hands through a pedal-like motion (Figures 4 and 5). There are no significant pressures applied axially to the neck, and no extreme range of motion of the neck is required. This eliminates the need to use the head and neck as a lever for the movement of the rib, which may be absolute or relative contraindications in select conditions of the cervical spine (eg, herniated disc, radiculopathy, cervical myelopathy, cervical instability, or vertigo).

This new technique also eliminates the need to use the upper limb as a lever for the movement of the rib, which may be contraindicated in select conditions of the shoulder girdle (eg, shoulder ([continued from page 9])

![Figure 2. Diagnosing rotation component of the thoracic inlet. Palpating the anterior-most aspect of the first rib to determine which one is more posterior, or closer to the table.](image1)

![Figure 3. Diagnosing sidebending component of thoracic inlet somatic dysfunction with static and dynamic palpation of the most superior aspect of the first rib.](image2)

![Figure 4. Indirect position of treatment for thoracic inlet diagnosis: sidebent right, rotated right. White arrows indicate anterior or posterior. Purple (larger) arrow indicates inferior (caudal) direction.](image3)
**Figure 5.** Photographs depicting hand placement through the steps of the technique for thoracic inlet diagnosis, sidebent right, rotated right.

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<thead>
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<td><img src="image1" alt="Hand Position" /></td>
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<td>1. Starts in a superior/anterior position</td>
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<td>3. Then to inferior/posterior position</td>
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<td><img src="image7" alt="Hand Position" /></td>
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<tr>
<td>4. Then back to neutral</td>
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impingement, instability, or rotator cuff syndromes with acromial bone spurs). Utilized in the hands of an experienced osteopathic physician, the technique can be performed safely on patients with the following challenging conditions (among others):

- neurologic conditions (cervical stenosis, radiculopathy or myelopathy, thoracic outlet syndrome)
- musculoskeletal or spinal conditions (aside from acute or unstable fractures of the first rib; eg, cervical spondylolisthesis with instability, shoulder instability or other significant mechanical disorder of the shoulder girdle)
- post-cervical spine surgery (laminectomy, discectomy, fusion)
- vascular issues (which may preclude certain positions of the cervical spine, eg, vertebrobasilar insufficiency, significant carotid disease)
- benign paroxysmal positional vertigo
- acutely ill or even ventilated patients if/when OMM is appropriate

Efficiency
The technique is rapid and efficient as: (1) the hand placement for treatment is identical to portions of the diagnosis; (2) both the rotation and sidebending component of the dysfunction can be treated with one technique; and (3) as a passive technique, minimal participation or feedback from the patient is required.

Once consent has been obtained to provide OMT, the technique can be performed with minimal need for patient cooperation or feedback, which can be challenging in situations with limited communication such as younger pediatric patients, patients with language barrier difficulties, or mental impairment. The position of diagnosis and treatment, combined with the short duration required for treatment and re-evaluation, ensures a time- and energy-efficient treatment.

Effectiveness
I have been utilizing this technique approach almost exclusively as the initial treatment for somatic dysfunctions of the thoracic inlet (SDTI) in clinical practice the past 7 years with significant success. The ultimate goal with correction of SDTI is improved function—whether the primary issue was articular or myofascial restriction (Paul R. Rennie, DO, FAAO, e-mail communication, May 15, 2015).

As with classic Still technique, the indirect and direct components can address both articular and myofascial components of the somatic dysfunction. Effectiveness can be appreciated rapidly with a recheck after the technique is performed.

Considerations for Challenging Thoracic Inlet Corrections
The new Still technique presented above can be very effective and efficiently delivered as a first-line treatment for almost any patient. Some more challenging SDTIs can be resistant to correction with an initial, single technique. A simple modification to the technique is presented for significant non-neutral dysfunction. Considerations on choice of secondary thoracic inlet technique are discussed. Expanding one’s focus to key somatic influences in the region is presented as well.

A modification to the proposed technique
Non-neutral dysfunction of T1 may be appreciated with the thoracic inlet, particularly in patients presenting with pain in the region. With the technique presented here, a modification can be utilized to address flexion or extension preference of T1 if present.

Slight tilting of the wrists into either flexion or extension can be utilized with the initial indirect positioning (Figure 6, page 13). Following Still technique principles, this can be reversed when proceeding through toward the direct barrier.

Further considerations
When somatic dysfunction of the thoracic inlet persists following application of this technique, one needs to consider further treatment focused on the inlet. When considering the choice of technique, many factors may ultimately weigh in the decision.

Secondary technique for SDTI
For instance, upon re-evaluating the SDTI, one may take some clues that can guide the choice of approach. If, with dynamic palpatory evaluation of the superior/posterior aspect of the first rib (sidebending component, Figure 3), one appreciates a hard-end feel with application of caudal pressure on the superior rib, one may find improvement with a secondary technique that best addresses the articular component of the dysfunction (eg, HVLA or low velocity, moderate amplitude (LVMA)).

If, upon re-evaluation of the superior first rib, one continues to appreciate a static asymmetry that demonstrates reasonable “give” with dynamic palpatory assessment (as described above), the persistent thoracic inlet dysfunction may respond to secondary techniques with either direct or indirect approaches (eg, ME, MFR, balanced ligamentous tension, LVMA etc.).

(continued on page 13)
If the SDTI resists a secondary technique approach, it is imperative to expand the focus. I may broaden my perspective to include evaluation of upper thoracic or rib somatic dysfunction (inhalation somatic dysfunction holding ribs in inhalation), or perhaps evaluate for myofascial tightness of scalenes holding the rib elevated. It is prudent to evaluate for key myofascial restrictions (muscles attaching in—or crossing through—the thoracic inlet region).

Additionally, articular or position dysfunction of the clavicle, sternum, and scapula may need to be further addressed. Postural and/or segmental dysfunction of the cervical spine and occipital-atlantal region also may need to be addressed.

When the rotation component of the thoracic inlet appears challenging to correct, evaluate shoulder girdle dysfunctions, especially shoulder protraction. Addressing strains in the pectoral, subscapularis, or latissimus muscles; addressing articular dysfunction of the clavicles and posterior (upper) ribs; or providing clavipectoral stretch, and/or muscle energy to the entire shoulder girdle can help to balance the body in the coronal plane and correct dysfunction which may be impacting thoracic inlet rotation.

Conclusions
The clinical relevance of the thoracic inlet region has been well documented in osteopathic literature. Treating this region is particularly important for the physician utilizing a respiratory-circulatory approach to OMT with the goal of improving homeostasis and overall health.

There remain challenges to rapid and effective resolution of SDTI. A significant reason is that SDTI is often confounded by compensation for other conditions, eg, biomechanical, postural, or traumatic. Utilizing a more global approach with awareness of the dynamic structural relationships and functionality of the region, one can approach the inlet with enhanced success.

Proposed in this paper is a new technique utilizing Still technique principles. The technique is effective in that it is both indirect and direct and can address both myofascial and articular restrictions. It is highly efficient, presenting a means of addressing the thoracic inlet somatic dysfunction with one technique and from the same body and hand position as the diagnosis and post-treatment re-check. It is also safe for use with nearly all presenting patients.

References
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(continued from page 13)


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Osteopathic Manipulative Treatment in the Management of Pediatric Headache and Orthodontic Intervention: A Case Report

Katherine Heineman, DO

Abstract
The incidence and frequency of pediatric headache has increased over the past 3 decades, affecting as many as 88% of children and adolescents. Currently, there are no approved acute treatments for recurring headache or migraine in childhood, and few medications for the management of pediatric headache have been studied in controlled trials. In addition, an insufficient number of reports in the current literature provide examples of conservative management for pediatric headache. Here, the author describes a case of a 10-year-old girl with a history of unremitting headache and orthodontic intervention. Her symptoms resolved following removal of the orthodontic intervention in conjunction with osteopathic manipulative treatment (OMT). The present case suggests further study involving osteopathic evaluation and OMT should be considered as a safe and effective option for conservative management of secondary pediatric headache.

Introduction
Headache is one of the most common health complaints of children and adolescents. The incidence and frequency of headache in childhood and adolescents has increased at an alarming rate over the past 30 years. One study looking at long-term trends in the incidence of headache in schoolchildren showed the risk of frequent headaches more than doubled between 1974 and 2002. The prevalence of headache is estimated to be 10% to 20% in the school-age population. Frequent headaches have a significant impact on a child’s quality of life, including decreased school functioning, decreased socialization, and decreased home functioning. Headache is the third most common cause of school absenteeism among illness-related causes.

Headaches are generally classified as either primary or secondary. In a primary headache disorder, such as in migraine or tension-type headache, the headache is thought to be intrinsic to the nervous system and not attributed to another disorder. In a secondary headache, the headache is the symptom of a specific etiology (e.g., medication overuse, intracranial hemorrhage), identifiable structural abnormality (e.g., brain tumor) or metabolic abnormality (e.g., acute febrile illness). Few medications for the management of pediatric headache have been studied in controlled trials. As a result, in reviewing the pediatric, headache, and neurologic literature, there are currently no approved acute treatments for recurring headache or migraine for children younger than 12 years of age. Despite limited data for the safety and efficacy of these medications, many have been tried. Prophylactic therapies that have been used for migraine and other headaches in children or adolescents include antidepressants, eg, tricyclic antidepressants, nonselective reuptake inhibitors and serotonin-selective reuptake inhibitors; antihistamine/antiserotonergics; antiepileptics, eg, dival-
In this report, a case of secondary pediatric headache caused by an orthodontic intervention resolved following removal of the orthodontic intervention and use of osteopathic manipulative treatment (OMT). Relevant medical literature related to orthodontic intervention, headache and the use of osteopathic manipulative medicine as it relates to this case is reviewed.

Report of Case

Presentation and Examination

A 10-year-old girl presented for evaluation of a 2-month history of headaches. The patient’s mother stated that the patient had a history of headaches before the 2-month period; however, the headaches were usually mild and resolved spontaneously. The patient’s recent headaches were much more intense and not resolving.

The week the patient presented, she had headaches in the morning and evening “to the point of tears.” The patient had been evaluated previously by her pediatrician, who offered diazepam as a treatment option. The patient’s mother denied the treatment and brought her instead to the Osteopathic Manipulative Medicine Clinic.

The patient stated the headaches were located in the posterior occipital region bilaterally with tension down the cervical spine. She had no history of major injuries. Physical education was the patient’s only activity. During the time of a headache, aggravating factors included loud noises, and alleviating factors included heat and a quiet, dark space.

On further questioning, the patient’s mother stated the patient had worn headgear for approximately 1 year in preparation for braces. The patient usually wore the headgear each night, but had not been wearing the headgear over the past several days due to the headaches.

On presentation to the clinic, past medical history included headaches and seasonal allergies. On review of systems, the patient denied vomiting, fever, blurred vision, other vision changes, or syncope at headache onset. The patient also denied tobacco, alcohol, or illicit drug use. On presentation, the patient’s blood pressure was 100/66 mm Hg; pulse rate, 88 beats per minute; weight, 67.6 pounds; and height, 54.5 inches.

Physical examination revealed a healthy appearing young girl with a body mass index of 16. Head and face were symmetric, normocephalic and atraumatic. External inspection of ears and nose was without lesions or masses. Mucous membranes were moist.

Osteopathic structural examination revealed occipitoatlantal joint extended, rotated left, side-bent right; C3 flexed, side-bent and rotated right; T3-5 rotated right, side-bent left; the right innominate rotated anteriorly and inferiorly; the sacrum in a left-on-right backward torsion pattern; and the cranium in a right lateral strain pattern.

Treatment

After obtaining verbal informed consent from the patient’s mother, the patient was treated with OMT on the day of presentation to the clinic.

OMT included muscle energy to the thoracic region and sacrum, strain-counterstain to the cervical region, and osteopathic cranial manipulative medicine (OCMM). The patient tolerated the treatment well without complication.

At the completion of the visit, the patient was instructed to keep off the headgear for several days, after which time, she could return to wearing the headgear. She was also asked to return in 1 week for reevaluation and to bring the headgear in with her at this visit.

(continued on page 17)
On return to the clinic 1 week after presentation, the patient stated the headaches were notably improved without the headgear. After not wearing the headgear for 3 days following treatment, she wore the headgear on a Tuesday night and had a significant headache the following day, such that she was unable to go to school. Tylenol did not help the headaches and nonsteroidal anti-inflammatory upset the patient’s gastrointestinal system.

At this follow-up visit, the musculoskeletal examination findings revealed a left-on-left forward sacral torsion, and again, a right lateral cranial strain pattern. The lateral cranial strain was treatable with OCMM; however, when the patient placed the headgear on, the lateral cranial strain immediately returned and remained present despite removal of the headgear less than 1 minute later.

The lateral cranial strain was again treated to resolution with OCMM. A discussion ensued with the patient and the patient’s mother, as it was strongly encouraged for the patient to pursue another option for orthodontics over the headgear as it was apparent that the patient was unable to tolerate the headgear at this time. The patient had an appointment with her orthodontist the following week and the patient’s mother stated she and her husband were quite willing to entertain alternative options for moving forward without the headgear secondary to the severity of headaches in their child.

The following week, the patient and her father returned to the clinic. The patient had not worn the headgear through the week and her headaches remained entirely resolved. The family had met with the orthodontist, who said the patient had made enough progress of jaw motion with the headgear and the patient could cease wearing the headgear and the patient could cease further wear of the headgear to the severity of headaches in their child.

Discussion
In the above case, the patient’s headache was preceded by initiation of early headgear treatment in preparation for further orthodontic interventions. In reviewing the orthodontic literature, there is much debate over the appropriate initiation of treatment time.12,13 Studies report a considerable amount of orthodontic treatment is often instituted prior to age 11 years, although there have been few reports assessing the effectiveness of orthodontic interventions at and prior to 11 years of age.13 One study by Pirttiniemi et al aimed to determine the long-term effects of early headgear treatment on craniofacial structures in children aged 7.6 years.12 In the study, 34 children were randomized to the headgear arm of the study; however, cephalometric values between the early headgear group and the control group did not differ significantly, suggesting there may not be strong enough evidence at this time to support early use of headgear.12,13

Within the orthodontic literature, there also appears to be a lack of studies evaluating orthodontic interventions and its influence on pain and discomfort, including headaches.14 A study by Feldmann et al reported that 95% of orthodontic patients report experiencing pain during the treatment, with 25% still reporting pain after the first week, but there are few randomized controlled trials that quantify and compare the perception of pain between different orthodontic techniques.14,15 “Do you ever have a headache?” and “If yes, how often do you have a headache?” were 2 self-reported questions from a questionnaire provided to 3 arms of orthodontic treatment, 1 of which was headgear.14 The results of the study found very few significant differences between patients’ perceptions of pain, and the results for headache were not well delineated.14

Osteopathic manipulation looks to explore the relationship between the presenting symptom of headache and secondary causes (eg, the potential effects of headgear) on the cranium and other somatic structures of the patient. Membranous articular strain, or cranial strain patterns, can occur as either physiologic in origin, such as is caused by daily life, or pathologic-type strain pat-
terns, such as those caused by dental work, external force, or other trauma.\textsuperscript{16,17}

A lateral cranial strain pattern is defined as a palpatory pattern of a strain of the sphenobasilar symphysis displaced with the basisphenoid moving to 1 side and the basiocciput moving to the other.\textsuperscript{18} Lateral and vertical strain patterns are not considered physiologic and are often a result of physical trauma.\textsuperscript{17,19} In addition, these lateral and vertical strain patterns have symptoms that are often more severe and are unlikely to resolve spontaneously.\textsuperscript{17,19}

Despite removal of the orthodontic intervention, it appeared following initial treatment that the patient’s lateral strain pattern was not resolving on its own without the addition of osteopathic manipulation. In addition, as described in the case history, the patient would likely have been subject to further continued trials of medication, despite the lack of data for approved acute treatments for recurring headache in the pediatric population.

**Conclusion**

Despite the increasing incidence and frequency of pediatric headache, there are no reports in osteopathic literature or otherwise to investigate the effects of OMT on pediatric headache. Trials and use of medications are not currently approved and may not be effective in addressing the root cause of headaches in children.

The present case suggests further study should be considered for the use of OMT as a cost-effective and therapeutically-effective approach in the management of secondary pediatric headache.

**References**

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1. Despite limited data for the safety and efficacy of this/these
medications, prophylactic therapies that have been used for
migraine and other headaches in children or adolescents include:
   a. Tricyclic antidepressants
   b. Antihistamine/antiserotonergics
   c. Gabapentin
   d. Botulinum toxin type A
   e. All of the above

2. True or False: Headache is one of the most common health
complaints of children and adolescents.
   a. True
   b. False

3. A primary headache is defined as which of the following:
   a. Headache as a symptom of a specific etiology, identifiable
      structural or metabolic abnormality.
   b. Headache as intrinsic to the nervous system and not
      attributed to another disorder.

4. Which of the following cranial strain patterns was found
   in the described case secondary to the patient’s orthodontic
   intervention?
   a. Vertical strain
   b. Side-bending rotation
   c. Lateral strain
   d. Compression of the sphenobasilar synchondrosis

Below are the answers to The AAO Journal’s December 2017 quiz on the article titled “Palpatory and Ultrasound Assessment of Cervical Dysfunctions and the Effect of Cervical High-Velocity, Low-Amplitude (HVLA) Technique” by Theodore B. Flaum, DO, FACOFP; Arfa Mirza, DO; Frances Mary-Ann Rusnack, OMS V, et al.

1. a. and b. HVLA and cranial vault hold were applied to
   participants in the experimental and control groups.

2. d. Patients with all of the headache types listed may
   benefit from spinal manipulation.

3. c. Physicians agreed the somatic dysfunctions had been
   resolved in 25 patients in the experimental group and 0
   patients in the control group.

4. b. Low energy consumption is not listed as a reason to
   replace MRI or CT with ultrasound.
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Rethinking Superior and Inferior Sacroiliac Shear: A New Approach to Diagnosis and Treatment

Stephen I. Goldman, DO, FAAO, FAOASM, and Richard L. Van Buskirk, DO, PhD, FAAO

Abstract
The concept of upslipped and downslipped innominate dysfunction has been a part of osteopathic teaching for more than 50 years. In more recent years, the terminology has evolved into superior and inferior innominate shears. The assumption that these somatic dysfunctions result from vertical shearing at the sacroiliac (SI) joint is evaluated in light of new research on sacroiliac motion and stability and the authors’ clinical experiences. The authors propose that the apparent superior or inferior shift of an innominate is better accounted for by sidebending of the innominate at the sacroiliac joint. Altered treatments based on this new understanding are presented.

Background
The concept of superior or inferior shearing of the innominate along the long axis of the sacroiliac (SI) joint has been detailed in osteopathic literature and taught in osteopathic schools for more than half a century. The first published mention of innominate dysfunction was reported by Carl Phillip McConnell, DO, MD, in 1900. He wrote:

To be able to diagnose accurately and intelligently the pelvic region requires nearly as much skill as in examining the cervical region. ‘... The pelvis as a whole may be tipped anteriorly or posteriorly upon the spinal column. It may also be twisted or rotated laterally upon the spinal column. The most common lesions are subluxations of an innominatum forward, backward, upward or downward; or various combinations of these displacements, such as tipping forward and downward of an innominatum.1

Guy Dudley Hulett, DO, in 1904 wrote:

In speaking of an upward subluxation of the ilium reference must be made to the direction of displacement. In many cases of such lesion of the innominatum the condition is really a rotation of the bone about an axis passing horizontally through the pubic articulation [emphasis added]. Usually the cause of the subluxated innominatum is a strong jarring of the bone transmitted through the femur, as in the case of stepping abruptly and unconsciously upon a lower level; in this case the force is transmitted by the weight of the spinal column [emphasis added] through the sacrum. In either case, the tendency will be for an upward sliding of the innominatum upon the sacroiliac articulation, but without necessarily a similar upward sliding at the junction of the two innominata.2

Another early reference regarding upslipped innominate dysfunction was written by Charles Owens in 1937: “As to the lesions themselves, one innominate may be twisted forward and the other backward, or either may be twisted independent of the other….or, it may be slipped up or down on the sacrum.”3

(continued on page 22)
The concept that the innominate could be sheared upward or downward at the sacroiliac joint was delineated as “upslipped and downslipped” innominate dysfunctions as a part of the muscle energy model developed by Fred Mitchell Sr., DO, FAAO. It was first published in 1958 to explain and treat postural dysfunctions and pain syndromes. The structural findings proposed to demonstrate an upslipped or downslipped innominate included:

1. Superior or inferior iliac crest
2. Superior or inferior ischial tuberosity
3. Superior or inferior pubic tubercle
4. Superior or inferior posterior superior iliac spine (PSIS)
5. Superior or inferior anterior superior iliac spine (ASIS)

If all 5 of these landmarks were found to be superior in combination with a positive standing flexion test on the same side, this dysfunction was labeled an upslipped innominate. Conversely, if all 5 landmarks were found to be inferior in combination with a positive standing flexion test on the same side, it was labeled a downslipped innominate. In the muscle energy model, these 2 dysfunctions were labeled iliosacral dysfunctions as the innominate moved around the fixed sacrum. The upslipped innominate was always accompanied by a short leg on the same side. Likewise, the downslipped innominate was accompanied by a lengthened leg.

In more recent years, it has become more common to use the term superior innominate shear for Mitchell’s upslipped innominate and inferior innominate shear for what he termed a downslipped innominate.

Possible Causes of Innominate Shear
It has been hypothesized that both superior and inferior innominate shears are due to injury or trauma such as a motor vehicle accident, fall, stepping into a hole, etc. The interpretation of these findings was that the sacroiliac joint had been subjected to shearing forces along the long axis of the body and developed a new ease at the end of its normal physiological longitudinal motion and a restriction from movement in the opposite direction. This left the innominate superior or inferior relative to the sacrum at the dysfunctional joint. Longitudinal shearing was presumed to be the result of severely abnormal vertical forces rather than the normal postural forces transmitted during standing or walking. Yet, in our clinical experience, we find that patients frequently present with the complaint of low back and/or pelvis pain with evidence of superior or inferior innominate shear, but they cannot recall any injury prior to the onset of their symptoms.

Other situations noted frequently in clinical practice by the authors as having been present and potentially causally related to superior or inferior innominate findings include viscerosomatic dysfunctions and sleeping in a lateral recumbent position without support of the upper leg. We also have observed that simply standing or sitting for a prolonged period with the majority of the body weight on one innominate can result in an upslipped innominate. Finally, the upslipped innominate is seen frequently when there is a pain-causing issue in that leg, presumably due to a nociceptive reflex similar to that seen when 4-legged animals lift the affected leg and walk on the other 3.

Another set of questions arose from the sacroiliac shearing model related to the inferior sheared innominate. First, if the inferior innominate shear was the result of an overwhelming force that sheared the innominate downward at the joint, it should be exceedingly rare. In fact, it is less common than a superior innominate shear. However, our clinical experience suggested that an inferior sheared innominate was, in fact, a fairly common diagnosis. Second, it was frequently seen in situations that did not involve significant force. Third, it was often seen in situations involving a superior innominate shear on the contralateral side. And finally, any inferior innominate shear should have been easily and spontaneously reduced by simply standing or sitting with most of the weight on that leg or hip. In fact, even the process of standing or even jumping with most of one’s weight on the leg of the inferior innominate shear did not reduce the shear.

The primary factor that influenced the development of an alternative explanation for the apparent sacroiliac shearing was the magnitude of the leg length disparity caused by apparent sacroiliac shearing. In the supine patient, it could be well in excess of the 2 mm to 4 mm vertical motion allowed at the sacroiliac joint. In the authors’ experiences, many patients would demonstrate a functional leg length discrepancy that exceeded 13 mm (0.5 inch). On a number of occasions, the leg length discrepancy might be as much as 38 mm (1.5 inches).

Part of the apparent leg length disparity could be due to unleveling of the sacral base. However, it has been demonstrated that there is no consistency in the relationship between sacral base declination and apparent leg length discrepancy. In fact, most sacral base unleveling is associated with L5 segmental dysfunctions, not with sacroiliac shears. Interestingly, Qureshi et al found the superior sheared innominate to be more common than either anterior or posterior rotated innominates when side was not considered and the left superior sheared innominate to be the most common innominate dysfunction overall.
(continued from page 22)

While part of the apparently excessive leg length discrepancy with innominate shears was found to be due to a simultaneous superior innominate shear on 1 side and an inferior innominate shear on the other, the leg length discrepancy was well in excess of the anatomical shearing allowed at the sacroiliac joint (which could be as much as 8 mm if both innominates were sheared). Even though part of the apparent leg length discrepancy might be due to longitudinal torsions involving the hip and leg, there was still too much of an apparent vertical shear in the sacroiliac joint. Newer research into sacroiliac joint anatomy, stability, and gait mechanics also began to cast doubt on whether any significant superior or inferior displacement of the innominate could truly occur without severe bony and ligamentous injury to the pelvis.

Anatomy of the Sacroiliac Joint

The sacroiliac joint in human beings is one of the most complex joints in the body. The joint surface is generally L-shaped with the short leg superior and the angle facing anterior. In about 20% of the population, it may be E-shaped or triangular. The sacrum itself is the result of the fusion of 4 embryonic sacral vertebrae. The superior 3 (S1, S2 and S3) are involved in the sacroiliac joint.

The joint surface is highly irregular, but the majority involves a longitudinal concave surface on the sacral side and matching convex surface on the iliac (innominate) side. Both surfaces are covered in cartilage with the sacral surface being thicker. The joint space varies between 2 mm and 4 mm inferiorly. A projection from the iliac side with a concomitant sacral indentation is sometimes noted at S2 and is considered the pivot area for sacral nutation and counternutation.

In addition to the expected joint capsule enclosing the whole joint, there are a number of transverse supporting ligaments both anterior to the joint and posterior. Relatively, the posterior ligaments are among the thickest and strongest in the body. The anterior ligaments are still substantial but less robust than the posterior ligaments. Motion allowed by the anatomy of the joint itself and these powerful ligaments is between 2° and 18° of nutation/counternutation and up to 4 mm motion in any direction.

The 2 primary muscle groups attaching to the sacrum are multifidis between the upper posterior sacrum and the PSIS and piriformis anteriorly and inferiorly. Piriformis inserts on the femur, bridging across the anterior surface of the ilium. Both have the potential of compressing the sacroiliac joint. Tendon slips from gluteus maximus also cross over the sacroiliac joint attaching to the posterior sacroiliac ligaments and the surface of the sacrum. Therefore, gluteus maximus has the potential to compress and stabilize the sacroiliac joint as well.

Current Research

Research on the motion dynamics of gait has revealed that stability of the sacroiliac joint is a necessary component of gait mechanics and lumbo-pelvic stability. Vleeming et al have proposed the concepts of form closure and force closure to explain the stability that is necessary at the sacroiliac joints. According to this concept, stability of the sacroiliac joint is a necessary component of lower back stabilization and normal gait mechanics. Form closure is achieved by the friction created by the articular surfaces of the sacroiliac joint and the anatomical arrangement of the joints. Force closure is a dynamic process achieved by the weight of the body in combination with ligament force and action of muscle groups. In essence, the trunk and lower extremity via the sacrotuberous ligament, hamstring, gluteal mechanism, and trunk musculature act to create functional compression of the sacroiliac joint. Without sacroiliac stabilization, the body engages abnormal muscle sequential firing patterns. Eventually, the patient experiences low back pain as the result of these compensatory patterns.

If the body is truly dependent on sacroiliac stability and engages many ligamentous and muscular structures to guarantee this stability as proposed by Vleeming, it would take extraordinary forces to disrupt such stability. Most patients, unless they have experienced major trauma, will not experience an injury that could disrupt this intricate, strong interaction of neuromuscular and fascial compression forces. In fact, as detailed above, many patients with superior and inferior innominate shears report no injury at all prior to the onset of their findings.

Gracovetsky has proposed a different theory of sacroiliac stability based on several reasons:

1. The SI joint is shaped with reverse angulation, creating a warped surface that cannot slide.
2. Irregular surfaces of the SI joint create high levels of friction.
3. The demonstrated presence of a bony ridge at the level of S2/3, which he named the SG ridge. Gracovetsky proposes that this ridge helps prevent dislocation of the SI joint. If the proposed function of the Gracovetsky ridge is correct, then the SI joint is designed with a bony buttress that prevents superior and inferior dislocation.
4. The high friction surfaces of the SI joint and the bony matrix beneath them are designed for bony compression, not to help prevent shear. Thus, the SI joint appears to be designed not to prevent instability and shear, but to maintain compression.

If the body uses multiple approaches to assure sacroiliac stability, and if shear is no longer a viable explanation for superior and infe-

(continued on page 24)
rior innominate shear dysfunctions, then a new approach needed to be developed to explain how the innominate can appear to be sheared relative to the sacrum. Indeed, could the innominate appear to be sheared superiorly or inferiorly but actually be tilted medially or laterally? Moreover, how would such mechanics occur?

Proposed Mechanism
Based on the new understanding of sacroiliac motion and stability, we sought to develop a better model to explain the physical findings of apparent innominate shearing. We propose the following new explanation.

Findings of superior or inferior iliac crest in the seated, supine, prone, and standing positions indicate a mechanical alteration of the normal innominate position in reference to the sacrum in agreement with prior models. Our proposed mechanism for this finding is the development of a force that produces medial or lateral sidebending of the innominate on the sacrum.

For what has been traditionally termed a superior innominate shear, the sidebending of the innominate causes a relative gapping of the sacroiliac joint inferiorly and compression of the joint superiorly. The pivot point would be at the area of the S2 prominence. The focus or restriction caused by this forced sidebending would be in the superior portion of the sacroiliac joint (Figures 1a and 1b). The forced sidebending of the innominate on the sacrum balances the joint, increases the friction superiorly and changes the balance of the compression caused by the multifidis muscles superiorly and the piriformis inferiorly. In the absence of a new force that would rebalance the sacroiliac joint, this dysfunctional state becomes the new norm.

In the sidebent model, the iliac crest would be closer to the midline and the acetabulum, and therefore, the femoral greater trochanter will be more lateral. The leg on the affected side will appear to be shorter. It would also require the leg to be relatively abducted in order to remain parallel with the other leg. The anterior superior iliac spine (ASIS) and the posterior superior iliac spine (PSIS) along with the iliac crest would be more superior relative to their non-dysfunctional states.

Standing on the leg on the dysfunctional side will reinforce the sidebending at the sacroiliac joint since it will create a superior force vector along the axis of the leg. An outside force is required to return the innominate to its normal position and function.

Conversely, an inferior innominate shear is the result of a forced sidebending of the innominate toward the inferior part of the sacroiliac joint. The superior part of the joint becomes gapped and the inferior part compressed. In this situation, the pelvic brim is shifted outward to become more lateral relative to the midline, and the lower part of the innominate is shifted inward or closer to the midline. The iliac crest presents inferior to its normal presentation as do the ASIS and PSIS. Also, the acetabulum and greater trochanter become relatively medial and inferior to their normal positions. To remain parallel to the other leg, the leg on the inferior sheared innominate will be slightly abducted and the leg will appear to be lengthened. Again, standing on the leg of an “inferior sheared

(continued from page 23)

Figure 1a. Normal relationship between sacrum and innominate, anterior view.

Figure 1b. Right innominate superiorly sidebent at sacroiliac joint. ASIS and iliac crest are superior relative to the unaffected side.
innominate” will merely reinforce the abnormal position rather than reducing it if the innominate is sidebent.

If we assume that the maximal vertical shearing available at the sacroiliac joint is 4 mm, then that should be the maximum displacement of the innominate if it is sheared upward or downward as proposed by previous models. Each innominate itself averages 135 mm in width in the adult, and the sacral base is 106 mm wide. The average long-axis length of the sacroiliac joint is 52.17 mm (SD 5.29 mm) and the average short axis breadth is 38.96 mm (SD 3.85 mm). We can assume that the sacroiliac joint allows a maximum lateral deviation of 4 mm at either the sacral base end of the joint or sacral apex end of the joint. Calculations then suggest that the lateral innominate or iliac crest potentially could show a dorsal or ventral excursion of 10.35 mm if the innominate sidebends or pivots at S2. As noted previously, the data suggest that the innominates are not primarily sheared upward or downward in what has traditionally been termed innominate shearing. If there is also some vertical shearing, it would be a secondary motion contributing perhaps an additional 4 mm to the apparent innominate displacement.

Obviously, the ongoing use of the term innominate shear becomes awkward because it is an inaccurate portrayal of the actual processes. Thus, a more accurate description of innominate shears should be as follows:

- **Superior sidebent innominate** *(previously called superior innominate shear)*: Emphasizing that the superior aspect of the sacroiliac joint is where the sidebending compression occurs also provides continuity with the prior identification of the dysfunction as a superior innominate shear.
- **Inferior sidebent innominate** *(previously called inferior innominate shear)*.

We propose that reversing the sidebending movements of the innominate should reset the innominate back in its functionally normal position in relationship to the sacrum.

According to this model, the ASIS, ischial tuberosity, iliac crest, and PSIS landmarks will all be superior in the supine and prone positions in a superior sidebent innominate. The pubic symphysis could remain level as the innominate is not truly sheared upward. However, the pubic bone could be either superior or inferior since the innominate is not vertically displaced.

**Diagnosis Based on the Innominate Sidebending Model**

Physical findings of a superior or inferior sidebent innominate are similar to those found in conventional osteopathic examination.

The patient is examined in all 4 testing positions (standing, seated, supine, and prone). The following findings will be found in all positions in cases of a **superior sidebent innominate**:

- Superior iliac crest on the involved side with positive standing flexion test
- Superior ASIS, PSIS, and ischial tuberosity on involved side

Likewise, the following findings will be found in all cases of an **inferior sidebent innominate**:

- Inferior iliac crest on the involved side with positive standing flexion test
- Inferior ASIS, PSIS, and ischial tuberosity on involved side

Note that the pubic tubercle is not examined as part of this model. The proximal pubic ramus will demonstrate inconsistent findings in innominate sidebending and therefore is not considered diagnostic.

Compression applied anterior to posterior on the involved innominate through the ASIS will demonstrate decreased motion of the innominate on the dysfunctional side. The standing flexion test would continue to be positive on the dysfunctional side. The patient may also experience discomfort at the ASIS and/or the sacroiliac joint on that side. In cases that have been present for longer periods of time (weeks to months) the patient may also demonstrate tightness of the ipsilateral psoas, hip adductors and hamstring strings, and develop neuromuscular imbalance and back pain.

**Treating Sidebent Innominate Dysfunctions**

One of the classic high-velocity, low-amplitude (HVLA) treatments of an upslipped innominate is the supine traction tug. Interestingly, even though Mitchell’s muscle energy model discusses the upslipped and downsli\[...](continued from page 24)
To treat a patient who has a superior sidebent innominate:

1. The patient should be supine.
2. The leg on the affected innominate side should be adducted across the other leg, engaging the restriction at the superior sacroiliac joint (Figure 2). The physician’s hand may be placed against the lateral aspect of the thigh or knee on the affected side.
3. The patient should be instructed to push the leg laterally against the physician’s resistance for 3 to 10 seconds.
4. After the patient’s effort stops, the physician further adducts the affected leg. Repeat 2 more times.

Alternately for a superior sidebent innominate:

1. The patient should be lying on the nondysfunctional side at the edge of the table. The physician stands in front of the patient to help stabilize the patient.
2. The leg of the dysfunctional side is adducted with slight flexion at the hip to allow the upper leg to fall in front of the lower leg. Gravity will bring the leg and innominate into the restriction.
3. The physician places an operating hand on the lateral thigh of the affected innominate, and the patient is instructed to lift the leg toward the ceiling against the resistance of the physician’s hand.
4. After the patient lifts for 3 to 10 seconds, the patient’s effort is allowed to stop. Gravity and the physician’s hand gently press the leg into further adduction. Repeat 2 more times.

For an inferior sidebent innominate:

1. The patient should be supine.
2. The physician brings the leg and innominate into abduction to the restriction as palpated at the inferior aspect of the sacroiliac joint (S3) (Figure 3).
3. While the physician holds the leg in this position, the patient is instructed to push the leg on the restricted side toward their other leg for 3 to 10 seconds.
4. The physician then abducts the leg further into the restriction. Repeat 2 more times.

**Still Technique Model**

Based on the Still Technique model\(^\text{13}\) of osteopathic treatment, treatment is divided into 3 parts:

1. Placing the innominate in its position of anatomic dysfunction.
2. Applying compression or traction from a distant attached portion of the anatomy. (In this case, the leg.)
3. Using the compression or traction force to carry the innominate into a position of anatomical correction.

To treat a superiorly displaced innominate using Still Technique:

1. With patient in the supine position, the ankle is grasped by the operator with both hands, and the lower extremity is placed in abduction. This will then bring the innominate into its ease position of superior sidebending (Figure 4a, page 27).
2. Light compression or traction is applied to the lower extremity towards the superior part of the SI joint.
3. Maintaining this compression or traction, the lower extremity is then moved across midline into adduction (Figure 4b).

To treat an inferiorly displaced innominate:

1. With patient in the supine position, the ankle is grasped by the operator with both hands, and the lower extremity is placed in adduction (Figure 5a).

2. Light compression or traction is applied to the lower extremity toward the inferior aspect of the SI joint.
3. Maintaining this compression or traction, the lower extremity is then moved across midline into abduction (Figure 5b).

For both sets of treatments, the patient is then reevaluated in the supine and standing positions to assure that the pelvis has been returned to the level position and that the standing flexion test is negative.

(continued from page 26)

(continued on page 28)
(continued from page 27)

**Treating Combined Innominate Dysfunctions**

In cases of extreme pelvis obliquity that is not due to underlying scoliosis or leg length difference, patients may have sidebending dysfunctions of both innomates (superior sidebending on 1 side and inferior sidebending on the other side). This is often due to a stumbling injury or fall where 1 leg is placed in marked abduction or external rotation and the other leg is placed into marked adduction or internal rotation. This scenario often results in severe low back pain, frequently radiating into both buttocks or lower extremities. The apparent leg length discrepancy with the patient supine will typically be in excess of 18 mm (0.625 inch).

The primary dysfunction is the 1 found with the initial positive standing flexion test, and should be treated first. Combined innominate dysfunctions will result in a positive standing flexion test on the opposite side once 1 side of the pelvis is treated and reevaluated. Once the second dysfunction is treated, the pelvis will be found to be level and the patient will have a negative standing flexion test. Oftentimes, sacral motion dysfunction will be present with combined innominate dysfunctions and will need to be treated as well.

**Need for Research Verification of this New Model**

All new theories need to be tested and proven by scientific research. External body measurements are very difficult to reproduce accurately, and we welcome further research and ideas on how to accurately measure innominate motion relative to the lumbar spine and sacrum. Whether or not this new model stands the tests of time and future research, we find that this new treatment approach offers an easier, less traumatic approach to treating what have been traditionally termed superior and inferior innominate shears.

**Conclusion**

New research on low back pain and sacroiliac motion and stability coupled with clinical findings necessitates a rethinking of somatic dysfunctions that have been traditionally termed superior and inferior innominate shears. The authors propose a new model of innominate motion dysfunction based on sidebending of the innominate at the sacroiliac joint rather than a shearing motion along the long axis of the sacroiliac joint. Even though clinical experience supports this new model, future research designed to accurately measure innominate motion relative to the sacrum and spine is indicated to assess the accuracy of this new model of innominate motion dysfunction.

**Acknowledgments**

The authors thank Michelle M. LeMieux, DO, and Nicole Maree Rice, DO, residents in the integrated family medicine and neuromusculoskeletal medicine program at Beaumont Farmington Hills, for their many suggestions in developing this paper and diagnosing patients based on this new model.

**References**

Learn more at www.academyofosteopathy.org/Convocation. Registrations received after March 7 will be processed on-site.

2018 Convocation

OSTEOPATHIC LEGENDS
Their Legacies Live On

March 21-25
Hilton Anatole - Dallas
David R. Boesler, DO, program chair
Muscle energy technique consists of at least six different subtypes of technique all connected by patient cooperation contracting and relaxing muscles when instructed to do so. It is extremely gentle and versatile and can be used for acute, subacute and chronic musculoskeletal conditions. It can be used by physicians of all sizes, shapes, and strengths, utilizing balance and leverage to control the techniques.

Physicians attending this course will learn how to perform muscle energy technique and learn how to apply these technique to the management of headache, neck pain, acute torticollis, shortness of breath, respiratory pain, low back pain, osteoarthritis of the spine, and a number of other conditions.

**Continuing Medical Education**

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

**Course Times**

Friday and Saturday from 8 a.m. to 5:30 p.m.
Sunday from 8 a.m. to 12:15 p.m.

**Meal Information**

Morning coffee, tea and juice will be provided each day. Lunch will be provided Friday and Saturday. Notify AAO Event Planner Gennie Watts of any special dietary needs no fewer than seven days in advance.

**Course Location**

The Pyramids, Building Three
3500 DePauw Blvd., Conference Rooms A and B (lower level)
Indianapolis, IN 46268

**Travel Arrangements**

Contact Tina Callahan of Globally Yours Travel at (480) 816-3200 or globallyyourstravel@cox.net.

**Course Director**

Walter C. Ehrenfeuchter, DO, FAAO, has chaired the Department of Osteopathic Manipulative Medicine (OMM) at the Georgia campus of the Philadelphia College of Osteopathic Medicine (PCOM-GA) since 2005.

As a 1979 graduate of the Philadelphia College of Osteopathic Medicine in Pennsylvania (PCOM), Dr. Ehrenfeuchter was the profession’s first resident in OMM. He taught for 17 years in the OMM department at PCOM, and then he operated a private practice for eight years before moving to Georgia.

In 1990, Dr. Ehrenfeuchter became a fellow of the AAO. He is certified by the American Osteopathic Board of Special Proficiency in OMM, and he has taught in North America, Europe and Asia.

In spite of all his years in academia, Dr. Ehrenfeuchter thinks of himself primarily as a clinician, actively involved in patient care, who just happens to teach.

**Registration Fees**

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

**Register online at www.academyofosteopathy.org, or submit this registration form and your payment by email to GWatts@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.**

**AAO’s cancellation and refund policy.**

**AAO’s photo release statement.**
Course Description
Designed for both beginner and advanced students in regenerative injection techniques, this course will include a series of lectures that review foundational principles, anatomy, biomechanics, diagnostic testing, specific injection techniques for regions of the body and osteopathic manipulative treatment to complement injection techniques.

We will discuss the rationale for using prolotherapy or platelet-rich plasma injection in improving stability and integrity of ligaments, tendons and joints. Diagnostic evaluation of joint instability and enthesopathy will be a focus and will be included in the hands-on portion of the course.

Attendees will receive a copy of Principles of Prolotherapy by Dr. Cantieri, Dr. Pasquarello, and Thomas H. Ravin, MD. Injections will be performed on cadavers in a cadaver lab.

Course Directors
Mark S. Cantieri, DO, FAAO, is a 1981 graduate of what is now the Des Moines University College of Osteopathic Medicine in Iowa, and he is in private practice in Mishawaka, Indiana. He is certified by the American Osteopathic Board of Special Proficiency in osteopathic manipulative medicine.

George J. Pasquarello, DO, FAAO, specializes in neuromusculoskeletal medicine and osteopathic manipulative medicine (NMM/OMM), prolotherapy and platelet-rich plasma injections. He practices at University Orthopedics in East Greenwich, Rhode Island. A 1993 graduate of the University of New England College Of Osteopathic Medicine (UNECOM) in Biddeford, Maine, he is board certified in NMM/OMM, and he holds a certificate of added qualifications in pain medicine.

Both Dr. Cantieri and Dr. Pasquarello are past presidents of the AAO, and they have been teaching prolotherapy internationally for 18 years.

Registration Fees

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* The AAO’s associate members, international affiliates and supporter members are entitled to register at the same fees as full members. This course is not appropriate for students.

Meal Information
Morning coffee, tea and juice will be provided. Dinner will be provided on Thursday. Lunch will be provided Friday and Saturday. Notify AAO Event Planner Gennie Watts of any special dietary needs no fewer than seven days in advance.

Course Location
Marian University College of Osteopathic Medicine
Michael A. Evans Center for Health Sciences (30th St.)
3200 Cold Spring Rd., Indianapolis, IN 46222-1997

Travel Arrangements
Contact Tina Callahan of Globally Yours Travel at (480) 816-3200 or globallyyourstravel@cox.net.

Registration Form
Prolotherapy and Platelet-Rich Plasma Course
June 7-9, 2018

Name: ___________________________ AOA No.: ________
Nickname for badge: ________________
Street address: ____________________________
City: ________ State: ________ ZIP: ________
Phone: ________________ Fax: ________________
Email: ____________________________

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

Signature: ____________________________

View the AAO’s cancellation and refund policy.

Register online at www.academyofosteopathy.org or submit this registration form and your payment by email to GWatts@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.
Component Societies and Affiliated Organizations
Calendar of Upcoming Events

April 20-24, 2018
Michigan State University College of Osteopathic Medicine
*Muscle Energy: Part I*
Course director: Carl Steele, DO
East Lansing, Michigan
34 credits of AOA Category 1-A CME anticipated
Learn more and register at com.msu.edu/cme.

May 4-6, 2018
Osteopathy’s Promise to Children
*A Dental Course: Expanding the Osteopathic Concept—Beyond the Basics*
Course directors: Raymond J. Hruby, DO, MS, FAAODist, and Darick Nordstrom, DDS
Osteopathic Center San Diego
24 credits of AOA Category 1-A CME anticipated
Learn more and register at the-promise.org/cme/.

May 4-8, 2018
Sutherland Cranial Teaching Foundation
2018 Basic Course: Osteopathy in the Cranial Field
Course director: Hugh M. Ettlinger, DO, FAAO, FCA
New York Institute of Technology
College of Osteopathic Medicine
Old Westbury, New York
Learn more and register at www.sctf.com.

May 9-13, 2018
American Osteopathic Association of Prolotherapy Regenerative Medicine
Spring 2018 Annual Prolotherapy Conference
Course Directors: Gerald R. Harris, DO, and Ann Auburn, DO
The Marriott Legacy in Dallas
35 credits of AOA Category 1-A CME
Learn more and register at www.prolotherapycollege.org

June 1-3, 2018
Still Exaggeration Technique, LLC
Introductory Exaggeration Course
Course director: Jerry L. Dickey, DO, FAAO
New York Institute of Technology
College of Osteopathic Medicine
Old Westbury, New York
25 credits of AOA Category 1-A CME anticipated
Learn more and register at stillexaggeration.com.

July 13-17, 2018
Michigan State University College of Osteopathic Medicine
*Craniosacral Techniques: Part III*
Course director: Barbara J. Briner, DO
East Lansing, Michigan
35 credits of AOA Category 1-A CME anticipated
Learn more and register at com.msu.edu/cme.

July 25-29, 2018
Osteopathy’s Promise to Children
Foundations of Osteopathic Cranial Manipulative Medicine (The 40-Hour Basic Course)
Course director: R. Mitchell Hiserote, DO
Osteopathic Center San Diego
40 credits of AOA Category 1-A CME anticipated
Learn more and register at the-promise.org/cme/.

Aug. 3-4, 2018
Osteopathy’s Promise to Children
Advancing the Sequential Approach to Pediatric Osteopathy
Course directors: Mary Anne Morelli Haskell, DO, FACOP, and Julie Mai, DO
Osteopathic Center San Diego
16 credits of AOA Category 1-A CME anticipated
Learn more and register at the-promise.org/cme/.

Sept. 8, 2018
Osteopathy’s Promise to Children
OMT for Systemic Disorders and Physiological Functions: Cardiopulmonary and Immune Systems
Course director: Hollis H. King, DO, PhD, FAAO
Osteopathic Center San Diego
8 credits of AOA Category 1-A CME anticipated
Learn more and register at the-promise.org/cme/.

Sept. 14-16, 2018
Michigan State University College of Osteopathic Medicine
*Neuromuscular and Myofascial Release*
Course director: Lisa Ann DeStefano, DO
East Lansing, Michigan
19 credits of AOA Category 1-A CME anticipated
Learn more and register at com.msu.edu/cme.

Visit www.academyofosteopathy.org/affiliate-cme for additional listings.