

THE AAO

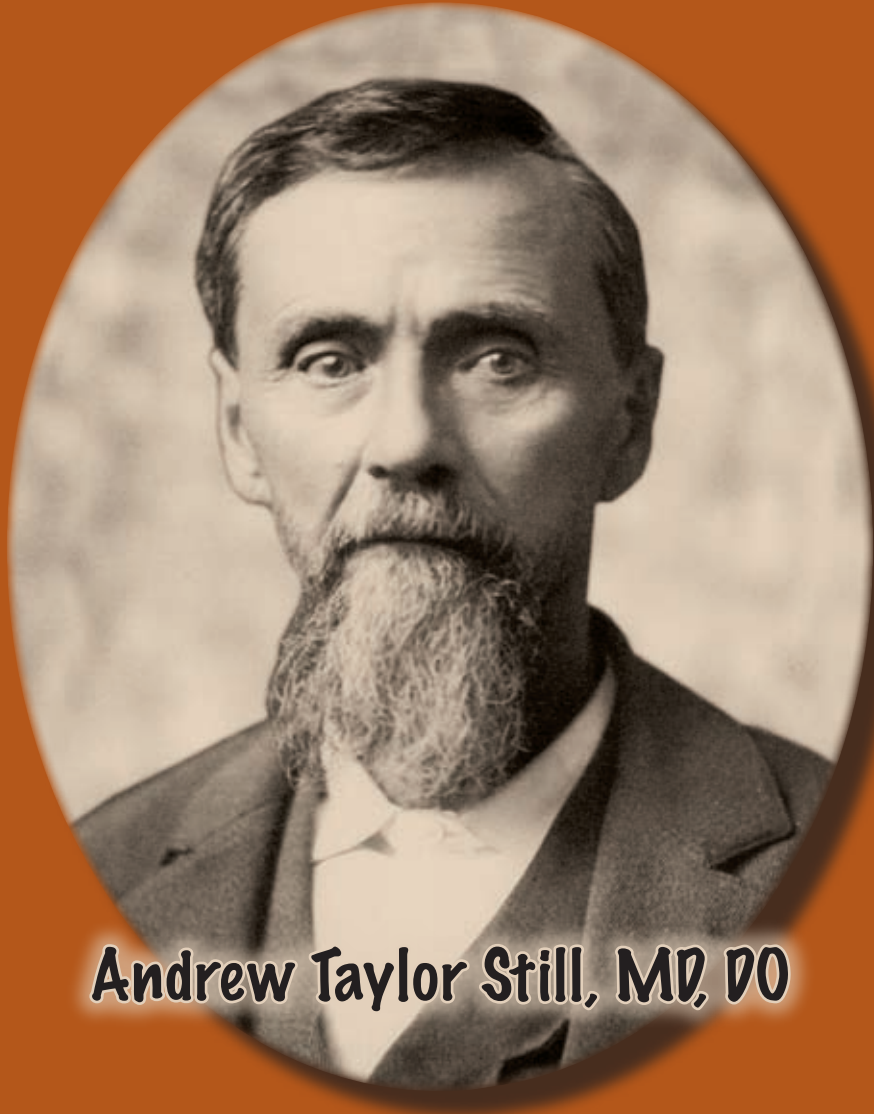
FORUM FOR OSTEOPATHIC THOUGHT

JOURNAL

 Official Publication of the American Academy of Osteopathy®

TRADITION SHAPES THE FUTURE

VOLUME 15 NUMBER 3 SETEMBER 2005



Andrew Taylor Still, MD, DO

Teaching, Research, Service

Instructions to Authors

The American Academy of Osteopathy® (AAO) Journal is a peer-reviewed publication for disseminating information on the science and art of osteopathic manipulative medicine. It is directed toward osteopathic physicians, students, interns and residents and particularly toward those physicians with a special interest in osteopathic manipulative treatment.

The AAO Journal welcomes contributions in the following categories:

Original Contributions

Clinical or applied research, or basic science research related to clinical practice.

Case Reports

Unusual clinical presentations, newly recognized situations or rarely reported features.

Clinical Practice

Articles about practical applications for general practitioners or specialists.

Special Communications

Items related to the art of practice, such as poems, essays and stories.

Letters to the Editor

Comments on articles published in *The AAO Journal* or new information on clinical topics. Letters must be signed by the author(s). No letters will be published anonymously, or under pseudonyms or pen names.

Book Reviews

Reviews of publications related to osteopathic manipulative medicine and to manipulative medicine in general.

Note

Contributions are accepted from members of the AOA, faculty members in osteopathic medical colleges, osteopathic residents and interns and students of osteopathic colleges. Contributions by others are accepted on an individual basis.

Submission

Submit all papers to Anthony G. Chila, DO, FAAO, Editor-in-Chief, Ohio University, College of Osteopathic Medicine (OUCOM), Grosvenor Hall, Athens, OH 45701.

Editorial Review

Papers submitted to *The AAO Journal* may be submitted for review by the Editorial Board. Notification of acceptance or rejection usually

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Manuscript

1. Type all text, references and tabular material using upper and lower case, double-spaced with one-inch margins. Number all pages consecutively.

2. Submit original plus three copies. Retain one copy for your files.

3. Check that all references, tables and figures are cited in the text and in numerical order.

4. Include a cover letter that gives the author's full name and address, telephone number, institution from which work initiated and academic title or position.

5. Manuscripts must be published with the correct name(s) of the author(s). No manuscripts will be published anonymously, or under pseudonyms or pen names.

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7. Describe the basic study design; define all statistical methods used; list measurement instruments, methods, and tools used for independent and dependent variables.

8. In the "Materials and Methods" section, identify all interventions that are used which do not comply with approved or standard usage.

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References

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2. For journals, include the names of all authors, complete title of the article, name of the journal, volume number, date and inclusive page numbers. For books, include the name(s) of the editor(s), name and location of publisher and year of publication. Give page numbers for exact quotations.

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THE AAO **FORUM FOR OSTEOPATHIC THOUGHT**
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TRADITION SHAPES THE FUTURE • VOLUME 15 NUMBER 3 SEPTEMBER 2005

A PEER-REVIEWED JOURNAL

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

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2005 AAO Calendar of Courses

OCTOBER

22 *Rapid OMT: Increase Your Reimbursement in an Ambulatory Setting*
Orlando, FL

23-27 *AOA Unified Convention:
AAO Program: Osteopathy in the Specialties:
A Hands-on Approach*
Kenneth E. Lossing, DO, Program Chair
Orlando, FL

NOVEMBER

11-13 *Prolotherapy: Below the Diaphragm*
UNECOM; Biddeford, ME

DECEMBER

2-4 *Lymphatic Approach to the Viscera*
AZCOM; Glendale, AZ

Jul 14-16 *Visceral Manipulation: Urogenital* in San Francisco – Kenneth Lossing, DO

Aug 18-20 *The Still Technique (Application of a Rediscovered Technique of Andrew Taylor Still, MD)* at Meridia Southpoint Hospital in Cleveland – Richard Van Buskirk, DO, FAAO

Sep 15-17 *Advanced Clinical Jones Strain-Counterstrain: Emphasis on Extremities* at University of Indianapolis – Edward Goering, DO

Oct 15 One-day course – Introduction to Osteopathic Medicine for the Non-physician Licensed Health Care Provider in Las Vegas – Karen Steele, DO, FAAO

Oct 16-20 *AOA Convention in Las Vegas – AAO theme: Tough Cases: How do I treat that? (Case-based presentations and treatment)* – John G. Hohner, DO

Nov 3-5 *Prolotherapy: Below the Diaphragm* at UNECOM – Mark S. Cantieri, DO, FAAO

Dec 1-3 *Visceral Manipulation: Membranes* in San Francisco – Kenneth Lossing, DO

Preview of 2006 Calendar of Courses

Jan 20-22 *Diagnosis of Muscle Imbalance and Exercise Prescription* at LECOM/FL – Brad Sandler, DO, with Philip Greenman, DO, FAAO as featured faculty

Feb 10-12 *Clinical Jones Strain-Counterstrain II: Pelvis and Extremities* at Arizona Osteopathic Medical Foundation in Tucson – Edward Goering, DO

Mar 19-21 *Visceral/Structural Integration* in Birmingham, AL – Kenneth Lossing, DO

Mar 22-26 *AAO Convocation* in Birmingham, AL *Practicing Osteopathy in an Evidenced-Based World* – Thomas Motyka, DO

Apr 28-30 *Diagnosis and Treatment of Low Back Pain and Introduction to Prolotherapy* in (location TBD) – Guy DeFeo, DO

May 19-21 *Prolotherapy: Above the Diaphragm* at UNECOM – Mark S. Cantieri, DO, FAAO

Jun 16-18 *OMT for Common Organic and Clinical Problems* at UMDNJ-SOM – Hugh M. Ettlinger, DO, FAAO and Michael L. Kuchera, DO, FAAO

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The Academic Triad

It is now more than 30 years since colleges of osteopathic medicine began to affiliate with various universities in the United States. This advancement in educational sophistication has led to the recruitment, development, and retention of faculty whose academic triad is generally described as *teaching, research, service*. These three pillars of academic behavior have exposed osteopathic clinical faculty to traditional university expectations for contributing to credible academic advancement in their respective areas of practice.

The theme of this issue generally surveys academic involvement at various levels (see *Contributors*, p. 6). The opportunity is taken here to comment on pending research activity as reflected by the Forty-ninth Annual AOA Research Conference Abstracts, 2005 (*JAOA*, Vol. 105, No. 7, July 2005, 317-320). Poster presentations under the heading *Osteopathic Manipulative Medicine/Osteopathic Principles and Practice* addressed:

- Intraocular Pressure Correlated with Osteopathic Manipulative Treatment
- Osteopathic Palpatory Findings in Hypertension, Type 2 Diabetes Mellitus, and Depression: A Case-Control Study
- The Impact of OMM on the Management of Tension Cephalgia
- The Virtual Haptic Back (VHB): A Progress Report
- Contributions of Cutaneous and Proprioceptive Inputs to Osteopathic Palpatory Diagnosis
- Effect of Counterstrain on Reflexes and Clinical Outcomes in Subjects with Plantar Fasciitis
- Osteopathic Palpatory Findings in Type 2 Diabetes Mellitus: A Case-Control Study
- Interexaminer Reliability of Osteopathic Palpatory Findings
- A Pilot Clinical Trial of Osteopathic Manipulative Treatment in Pregnancy

The institutions represented in these studies included: Department of Osteopathic Manipulative Medicine, Midwestern University/Chicago College of Osteopathic Medicine; Osteopathic Research Center, University of North Texas Health Science Center; Kansas City University of Medicine and Bioscience—College of Osteopathic Medicine; Interdis-

ciplinary Institute for Neuromusculoskeletal Research, Ohio University College of Osteopathic Medicine.

These poster presentations indicated a broad coverage of areas of osteopathic theory, methods, and practice. A random survey of conclusions suggests that investigators were judicious in their assessment and reporting of results:

- “The means demonstrated a lowering of Intraocular Pressure using OMT.”
- “Hypertension is strongly associated with bilateral trophic changes at T5-7, T8-10, and T11-L2.”
- “The use of OMM is as efficacious, if not more, than medication in treating tension headache.”
- “Objective results are beginning to reveal performance differences between groups in palpatory training using the Virtual Haptic Back.”
- “These results indicate that there are significant clinical responses to counterstrain in plantar fasciitis subjects, and that mechanical changes in the lower leg accompany the clinical responses.”
- “Although interexaminer agreement between fellows does not vary substantially according to spinal segment and laterality, it does vary according to the element of osteopathic palpation being performed.”

All of the reported studies demonstrated critical and thoughtful design as appropriate to an osteopathic orientation for assessment of results. This issue has been well addressed by Michael M. Patterson, PhD¹: “It is of great value to have physician researchers and PhD researchers who expend the time and intellectual energy to understand the profession’s theoretical and clinical perspectives, because the results of any study must be interpreted within some context. If the context is that of osteopathic medicine, the data are much more likely to be correctly used in understanding the profession’s basic questions.”

It is very encouraging that the research pillar of the academic triad is demonstrating solid foundation, critical development, and promise of continuation.

1. Ward, RC (Exec. Ed.). *Foundations for Osteopathic Medicine* (2nd Edition, 2003). Lippincott Williams & Wilkins. Philadelphia. 1169.

Contributors

Charles J. Smutny, III. The Instrument of our Distinction: The Hand. Palpation and palpatory diagnosis are central to osteopathic theory, methods and practice. In a very comprehensive and detailed document, the author discusses and explores this “highly complex neuro-sensory instrument that is calibrated by human activity and repetitive usage.” A portion of this document is presented for readers. Submitted in partial fulfillment of requirements for Fellowship in the American Academy of Osteopathy. Doctor Smutny was conferred status as Fellow in 2004. (p. 13)

Steve Paulus. Anatomy in the Osteopathic Field The author is well known for his dedication to the philosophy of Andrew Taylor Still. He self-published *Inter Linea: The Journal of Osteopathic Philosophy* (1999-2002). Further examples of his writing are available at his website, www.interlinea.org. This selection was the keynote address given at the A. Hollis Wolfe Presentation, AAO Convocation 2005, Reno, NV. In its appeal to “have a consummate understanding of applied anatomy”, it is admirably directed to students of osteopathy at all levels of education and practice. (p. 21)

Robert C. Clark. The Art of High Velocity Low Amplitude Osteopathic Manipulative Treatment. The author addresses a commonly encountered problem in the use and teaching of a classic method of manipulative intervention. In recognizing hesitation about use among osteopathic students and graduates, he proposes a number of recommendations to facilitate easier use by all. This selection is timely as regards concerns expressed throughout the professional community in recent years. (p. 25)

Jonethan P. DeLaughter and Russell G. Gamber. Lower Extremity Edema: A Case Report. The authors utilize a case history presentation to provide a very thorough discussion of the lymphatic, or “second circulatory system of the body.” They note the relative paucity of literature describing the use of OMT in the treatment of edema. The discussion presented is well worth retaining for the purpose of understanding the lymphatic system. This selection is of great practical value for students and practitioners alike. (p. 27)

Regular Features

DIG ON. Acknowledgment of the impact of a teacher is the highest reward for those who have committed themselves to the process of osteopathic education. This accolade is given to the memory of William E. “Wild Bill” Wyatt, DO (1927-2002). **Anthony D. Capobianco, DO** pays respect to this beloved teacher who, among many accomplishments, served as President of the American Academy of Osteopathy (1987-1988). (p. 8)

FROM THE ARCHIVES. *Dr. Still Begins To Teach Osteopathy.* Arthur Grant Hildreth was a member of the first class to study Osteopathy. He wrote that Dr. Still built a frame structure, fourteen feet wide and twenty-eight feet long for the purpose of holding instruction in his first class. At 10:00 AM on the morning of October 3, 1892, Dr. A.T. Still and Dr. William Smith began teaching the handful of men and women assembled in that building. (p. 11)

BOOK REVIEW. Norman Gevitz, PhD, completed his doctoral dissertation on *The DOs: Osteopathic Medicine in America*. First published by The Johns Hopkins University Press in 1982, a Second Edition was released in 2004. The author has significantly broadened his observations about the osteopathic profession in this contribution. *An Osteopathic Approach to Diagnosis and Treatment* first appeared in 1991. The Second Edition was released in 1997, and now the Third Edition makes its appearance in 2005. Doctors DiGiovanna and Schiowitz are joined by Dennis J. Dowling, DO, FAAO in this edition. (p. 33)

ELSEWHERE IN PRINT. Issues concerned with *Tooth Contact, Head Posture, and Research Diagnostic Criteria for TMD* are of great value to practitioners of Osteopathy in the Cranial Field. Three abstracts from *CRANIO, The Journal of Craniomandibular Practice*, should be of great interest to readers of *AAOJ*. (p. 35)

CME CREDIT. In response to reader requests, *AAOJ* will offer CME Credit to readers completing the enclosed quiz. At this time, 1 Hour II-B Credit will be offered, with request for upgrade as *AAOJ* qualifications are reviewed by the **American Osteopathic Association**. (p. 20)

Component Societies'

CME Calendar

and other Osteopathic Affiliated Organizations

September 22-24, 2005

Osteopathic Pioneers:
Honoring Paul Kimberly, DO, FAAO
KCOM Campus
Kirksville, MO
Contact: Rita Harlow, CME Director
660/626-2232

October 7-9, 2005

*SCTF Continuing Studies Course
Teaching the Teachers*
Course Director: Kenneth Graham, DO
Chicago, IL
Contact: Judy Staser
817/926-7705

October 8-9, 2005

*Advanced NFR Course –
Visceral Manipulation*
Arizona Academy of Osteopathy
CME: 16 Category 1A (anticipated)
Contact: Stephen Davidson, DO
602/246-8977 (AZ)
800/359-7772 (USA)
website: www.healthabounds2.com

October 14-16, 2005

Neurofascial Release Conference West
Arizona Academy of Osteopathy
CME: 24 Category 1A (anticipated)
Contact: Stephen Davidson, DO
602/246-8977 (AZ)
800/359-7772 (USA)
website: www.healthabounds2.com

November 13-16, 2005

Biodynamics Phase I: Biodynamics
Kona, Hawaii
CME: 21.5 Category 1A (anticipated)
Contact: Thomas Shaver, DO
207/778-9847

December 9-11, 2005

24th Annual Winter Update
Indiana Osteopathic Association
Indianapolis, IN
CME: 20 Category 1A (anticipated)
Contact: IOA
800/942-0501
317/926-3009

January 18-21, 2006

*17th Annual Osteopathic
Winter Seminar*
Pinellas County Osteopathic
Medical Society
Tradewinds Island Grand Hotel
CME: 27 Category 1A (anticipated)
Contact: Kenneth Webster, EdD
Executive Director
727/581-9069

February 22-26, 2006

*Midwinter Basic Course in Osteopathy
in the Cranial Field*
The Cranial Academy
Tampa, FL
CME: 40 Category 1A (anticipated)
Contact: The Cranial Academy
317/594-0411

June 17-21, 2006

June Basic Course
The Cranial Academy
Virginia Beach, VA
CME: 40 Category 1A (anticipated)
Contact: The Cranial Academy
317/594-0411

June 22-25, 2006

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Virginia Beach, VA
Contact: The Cranial Academy
317/594-0411

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Dig On



Legends and Lessons: William “Wild Bill” Wyatt, DO



Anthony D. Capobianco

Remembering Dr. Wyatt brings to mind warm memories filled with important lessons. I hope to honor him by speaking on behalf of the many he inspired and to those that would benefit from learning about one who contributed much to our traditional osteopathic heritage.

I first met this remarkable osteopath as a student in osteopathic principles and practice at the New England College of Osteopathic Medicine (NECOM), in Maine, just in its third entering class, 25 years ago. He seemed larger than life, radiating an immense aura of warmth amidst a jovial demeanor. He was extraordinarily articulate and demonstrative, yet rather soft-spoken. He was also a master at being able to shift, between all ranges of necessary forces according to the needs of the patient, from the subtle to the unmistakable. With movements of certainty and artistic skill, he literally choreographed a therapeutic dance bringing the patient into balance. Indeed, he personified this “shape shifting” ability: for all his appearance he was quite gentle. His authenticity and passion about osteopathy made him instantly captivating and effective in transmitting ideas that often tended to be difficult to convey.

It was apparent that the most important aspect of osteopathy to him was the primary respiratory mechanism (PRM). Right off, he impressed upon us the value of dedicating at least a few moments to deeply palpating the cranium of each of our future patients. Our first priority, he emphasized, was to sense the rhythm it expressed, evidence of the unseen force that gave us growth, healing and life. (Legend has it that the early members of the Sutherland Cranial Teaching Foundation, were excited and insistent about Dr. Wyatt attending a basic course. When he finally attended and was guided into palpation of the PRM, he exclaimed something to the effect of “Is this what you guys have been talking about? – I’ve been doing this all along!”) The very first lab session was simple but profound: it consisted of immediate and total immersion (obviously to offer us a glimpse of the ultimate truth before our allopathic corruption) into the core of osteopathy, having us attempt sensing of the cranial rhythmic impulse (CRI) of the PRM at the head. He displayed genuine joy when one of his students excitedly broke the silence and announced he could sense the CRI!

During my first year at NECOM, I was also fortunate to

have been assigned to him as my preceptor, at his office in Portland. While waiting to begin, I read through his extensive osteopathic curriculum vitae in brochure format. I remember that, despite his impressive academic achievements, he was not at all pretentious, even in the least. His sense of joy as a practicing osteopathic physician was also indelible. He taught me to be relaxed, more human with patients – to see them as people, and when appropriate, to lighten up the process of healing. I remember him helping many with complex problems that defied ordinary measures in a serious manner, only to interject a big smile, laugh or skit. On one occasion he staged an impromptu performance by marching around the waiting room wearing a funnel shaped object, which he noticed was nearby, wearing it upside down on top of his head for an impression of the Tin Man, a la The Wizard of Oz. It was as if this lesson came from knowing that I too would someday be deeply enjoying and yet struggling with the realities of practicing traditional osteopathy in an allopathic world. (He foresaw and stated that traditional osteopathy would not be accepted in the next (our) generation, but rather the one after us, because it was such a radical departure from the accepted and prevailing ordinary, “quick fix” approach.)

Since he was usually “in the moment”, a sense of play permeated his treatments; he seemed free from attachment to an outcome. Allowing a ready sense of play would help me to be more in the present moment and detach from clinical goals, freeing both myself and the patient from the burden of expectation, especially in the face of profound dysfunction. Osteopathic practice without these pressures would prove to nurture a more objective, expanded awareness from which diagnosis and treatment could unfold naturally. In turn, my own osteopathic learning and subsequent growth would be unhindered and encouraged, as well. It also allowed humor to be able to be accurately administered, to aid in the process of healing or the relief of suffering.

He endeavored to make osteopathy alive, something real, so we could hopefully grasp and enjoy its essence firsthand and thereby remember to consider it in our future interactions with patients. In addition to open-ended dynamic sensing sessions aimed at giving us a glimpse of the spirit of osteopathy, I remember he invited someone from his practice into class as a “live patient.” To better illustrate the intercon-

nectedness of the body, we were to consider that the woman standing before us suffered from chronic headaches, but from what area? He was pleased a student guessed the root cause was from a restricted sacrum.

My learning was further reinforced in another preceptorship rotation with him while he did real osteopathic rounds throughout the old Osteopathic Hospital of Maine. My first lesson in seeing past the illusion of fragility of patients, especially infants, came from him. I observed him going through the nursery, when necessary, confidently thrusting the cervical spines of newborns. He would hold them upside down by their ankles with one hand, apparently so the baby's head could serve as a means of traction, while he expertly sidebent and rotated it through the restrictive barrier. The mothers typically expressed relief and gratitude that he treated their babies.

From time to time he would comment on his early practice frustrations, then, apparently in non-manipulative practice settings. He spoke from experience as one whom evolved towards a more comprehensive and compassionate approach to suffering through osteopathic manipulation, much like the founder. This occurred many years before the public would be openly introduced to the concept of integrative medicine. It was a deep lesson to know that one could successfully integrate osteopathic diagnosis and treatment with ordinary medical knowledge.

His sense of charity was also immense. He often held elective nighttime workshops for interested students on the more subtle, energetic aspects of osteopathy. Not only would he donate food and drink, but also what I now realize was precious time and energy, in light of his large practice and family (12 children). He spoke of having and raising children, as many as God provided, with a reverence and welcoming joy rare for the times). His lessons on tactile sensing of alterations in the supine patient's aura or how one could become a human compass, for instance, supported and contributed greatly to my newly developing understanding of the many dimensions, and possibilities, within the evidently far reaching realm of osteopathy.

I understood that he gave unselfishly as he was given to; his abilities apparently given to him as a gift from above. It was not uncommon for him to treat students when they requested it of him. I remember an upper-classman stopping him in the school staircase with an acute hand strain. In addition to observing his generosity with osteopathic teaching, it left an impression to see him "practice what he preached" by effectively treating the entire limb and its attachments, in a way the original "lightening bonesetter" would have greatly approved of. Another time I recall him proudly telling me about a conference he had just attended. He was happy to have treated a hundred or so people without interruption, poolside, and in record time!

I recall Dr. Wyatt telling a group of us the story of how

an infant patient of his died of negligence on behalf of the child's parents. He was noticeably still deeply disturbed by this event by how he spoke about it, even though it apparently took place many years before. It was one of many instances where his compassion showed itself.

A simple and profound technique he taught, which comes to mind, has served me well throughout the years. With patient supine and osteopath standing at the foot of the table, both heels are firmly cradled. With knees locked, the doctor leans backwards, allowing both legs of the patient to be drawn inferiorly. This allows sequential engaging and releasing of restrictive barriers present throughout the body. Modifications could include treating one leg and its attachments at a time or adding internal or external rotation, and/or, abduction or adduction of the limbs for enhanced barrier engagement. Far beyond cataloging a technique, Dr. Wyatt explained the profound effect this approach had in decompressing the long-

term and continual, repetitive cumulative compressive impacting forces that gravity had on the entire upright body, especially affecting the lumbosacral region. (I have adjunctly "prescribed" this, in a simplified version, as a way in which patients with lumbosacral area restrictions could be somewhat helped by a caregiver at home. In this instance directions are to have the patient lie supine on

a bed while both heels are firmly cupped, whereby "traction" is sustained for 5 to 10 minutes, once or twice a day, or so. At least one release usually occurs over this amount of time, and often obviates the need for pharmacotherapy.)

Another time he reinforced the value of hunting further a-field, in this instance to consider the forgotten region of the anterior cervical musculature and fascia. With the patient supine, through a guided and thorough and precise palpation, I was surprised to discover various shaped and textured strains, many severe but apparently asymptomatic. He taught a direct soft tissue approach with finger pads for a very fine focal motion testing and release of myofascial strains in and around the sternocleidomastoid muscles, hyoid, etc. I would return to this lesson countless times to allow my fingertips to operate in confined quarters or to open my sensing up to what was distant or not obvious to help what was. The lesson added a vital dimension to treating thoracic inlet, temporomandibular and neck dysfunctions.

Looking back, "Wild Bill" was living and teaching the importance of treating from a state of fluidity, the art of being able to consciously shift perspective at will. His ability to be in the moment expanded or divided his awareness, allowing him to respond dynamically and promptly to the guidance of the "physician within". In this way he encouraged me to scan, sense and move with and respond dynamically to the flow of what was emerging throughout a treatment session.

He was probably the first to teach me the necessity of integrating and applying all ranges of force for release. High

*Looking back, "Wild Bill"
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the art of being able
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at will.*

velocity could precede or follow indirect cranial technique if that's what the body was calling for and the operator was awake enough to appropriately shift, providing the necessary forces. He was the first to explain the causes and importance of so-called "treatment reactions" involving post-treatment soreness from local lactic acidosis mobilization, and also vertigo, as a necessary reorienting phase of the semicircular canals after body rebalancing. All these lessons helped me begin to understand what was needed to help people with all types, degrees and levels of pathology and how to guide them in the wake of treatment so they could stay with and thereby fully benefit from the process.

He also seemed to be a never ending well of insights in matters concerning the care of osteopathic patients. He taught me that a visual acuity problem could be determined just by looking through the patient's glasses, held at arm's length. Inestimable was his lesson on distracting the patient by applying a tap or two, just before high velocity low amplitude technique. It consistently dramatically de-tenses the guarding common in engaging a tender restrictive barrier or approaching the body, especially the cervical region, in this manner. His "signature" distractive tapping preparatory maneuver has helped countless suffering patients desperately in need of this form of osteopathic adjustment.

His warning that "Pain is a liar!" proved correct after treating many hundreds of painless, yet restricted sacroiliac joints on the side opposite the symptomatic side. He knew the importance of practice life lessons in a field that was as much an art as a science, so was quick to interject his expansive experienced-based knowledge. I know he would be deeply saddened to see the current trend in medicine to discard or disregard anything that was not deemed evidenced based according to studies limited to "one-size-fits-all" protocols. In this regard he, like the founder, held true to the idea that osteopathic principles, primarily, should be taught as the foundation to practice, with the study of techniques used as a way to discover the principles first hand by direct experience. As I am increasingly challenged on a minute to minute basis, this proved to be an absolute blessing. To be able to modify techniques, devise and combine modalities to precisely suit the unique patient and individual strains at hand, with all their endless nuances, are tools he gave me that are always available. This kind of osteopathic learning, promoted clarity and confidence, and would provide an ever-present compass, for the storms from complex pathology that would present in everyday practice. His teaching helped me be able to craft durable and reliable tools; a detail-laden, technically overwhelming approach, weak in principles, could not have cultivated.

Dr. Wyatt shined at the American Academy of Osteopathy annual convocation's "Evening with the Stars", an informal but highly influential workshop where very experienced senior manipulating DOs inspire young would be osteopaths. I can still picture him, effervescent, as the awed students stood crowded around a real living osteopathic master at work. His demonstrations (e.g.: diagnosing of a piriformis restriction by observing leg position) seemed effortless,

punctuated with pearls of practical wisdom and complete with before and after visible proof to substantiate his commentary.

He was also cognizant of the fact that the majority of American osteopathic medical students were primarily allopathically oriented and trained. His classroom teaching policies reflected that he did not want to generate further antagonism towards traditional osteopathy, ever aiming to nurture a respect for it in place of the usual perfunctory tolerance. Before one practical exam, for example, he reassuringly announced that "We'll make you pass". There was much wisdom in not blindly forcing one to become an osteopath. If the student's intent was sincere, dedication to experiential study was serious and the longing to serve others in this way was present, he knew a student would receive training from the osteopathic community.

A lesson about humility came from observing him in his office at the end of another busy day. At the outset of his last appointment with a somewhat forlorn appearing young woman, he announced that he was going to completely do over the previous visit: he had decided the treatment session would not count because he apparently felt it did not measure up. It left an impression that he openly and directly addressed the situation for the benefit of both patient and me. Years later, only after having my own patients and students could I fully appreciate the importance of that incident.

I will always remember Dr. Wyatt's uniquely colorful, joyful spirit, his capacity for inspiring, sharing and applying traditional osteopathic teachings. His profound love of osteopathy made him an ideal influence and guide into this sacred world for many. I feel blessed to have been a student of his and to be able to contribute to his memory by sharing some lessons from such a beloved osteopath.

"In stillness, I light-bodied, set out for the other world."

1. Hoffmann, Yoel (ed.): Japanese Death Poems, Charles Tuttle Co., Inc., Rutland, VT, 1986, p. 186-7.

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Dr. Still begins to Teach Osteopathy

Arthur G. Hildreth

The Lengthening Shadow of Dr. Andrew Taylor Still, 1938°, Chapter III, pgs. 29-31

With the granting of the charter to teach osteopathy, there was an immediate increase in the duties of Dr. Still as he planned for the first school. The home of the Old Doctor, the cottage to the south, and the cottage on the north side of the street became veritable beehives of activity. That locality will undoubtedly go down in history as the sacred spot where osteopathy secured its first real start.



first class of instruction in osteopathy. The fact that this building was so small proves that Dr. Still had no conception of what his needs were going to be. This building was erected in front of the last cottage he bought on the north side of Jefferson street. It was here in this little building, on October 3, 1892, that the first class for studying osteopathy was organized. It was my privilege to be a member of that class. My wife and I had decided that we would undertake this move and determine through

As the practice grew and the fame of Dr. Still spread, Dr. Charlie Still was prevailed upon to go to another state. He located in Red Wing, Minn., and took with him a young friend, Dr. Charles Hartuppee, who, under Dr. Charlie's training, became his first assistant and afterwards one of the leading osteopathic physicians in that part of the country.

As soon as the charter to establish a school of osteopathy was issued to Dr. Still, he, with his advisers, began to lay plans for the organization of the first class to study osteopathy in the fall.

During the preceding summer, Dr. William Smith, a graduate in medicine of the University of Edinburgh, Scotland, who was traveling in this country for a wholesale medical supply house, visited Kirksville. Having heard of the Old Doctor and his miraculous cures, he decided to investigate. He told me he went over to call on the Old Doctor and to have a good time quizzing him. But lo and behold, like the prophets of old, he came to ridicule and to make light of Dr. Still but came away to praise him. From that visit on Dr. William Smith became quite a factor in the growth and early development of osteopathy. Later it was arranged for him to join Dr. Still the coming fall as the first teacher in anatomy in the first college of osteopathy.

Dr. Still arranged to build a little frame structure, fourteen feet wide and twenty-eight feet long, in which to hold his

actual experience whether I could learn to do the same kind of things Dr. Still was doing and to secure the same results. Our farm as well stocked with cattle, hogs, horses and some machinery. We sold all of these things and by the first of October we were living in Kirksville.

On the morning of October 3, 1892, at ten o'clock, Dr. A. T. Still and Dr. William Smith began teaching the handful of men and women who were assembled there to study osteopathy. They began to teach the system of treatment for human disease that was destined to become one of the most successful ever discovered. There can be no question of the fact that Dr. Still had little conception of what effect his discovery would have upon the practice of medicine. His teaching was absolutely new and revolutionary and at complete variance with the teaching in medical institutions of all time. It did not seem possible that his discovery would be as far reaching in its effects as it turned out to be.

Dr. Still spoke to the class that morning in his own inimitable way, and gave us an even better insight into his dream of a new science of healing. He emphasized, especially, his confidence in natural law as he understood it and the power of that law when unhampered by physical disturbances or interferences. We were led to understand his limitless confidence in that law and his belief that the human body had the power and the ability to manufacture all necessary substances

for its own maintenance and repair. That was a memorable occasion for those of us who had cut adrift from all other ties in life and were there for the purpose of following the teachings of Dr. Andrew Taylor Still. Dr. William Smith emphasized the fact that he had come there in the beginning to ridicule and to make light of Dr. Still's teachings, but that after listening to Dr. Still's reasoning, he could not help feeling that his theory was sound and based upon eternal truth. He gave us our first lesson in anatomy and proved to us the necessity of understanding the nervous system and its control over the body. He was one of the ablest and best teachers it has ever been my privilege to know. His method of demonstrating his teachings carried a conviction of truth in what he was saying and enabled us to learn readily. He gave to us students a knowledge of the origin of nerves and their function, the location of arteries and veins, the relationship of muscles, bones, and joints to the skeleton as clearly and as impressively as if he were dissecting these structures on a cadaver.

At that time, of course, it was impossible to secure dissecting material. The school was new, unrecognized, unheard of, except in a small way, and certainly without any standing in the medical world. Hence, Dr. Still and those enlisted with him were very fortunate in having Dr. William Smith, with his training and his high degree of intelligence, teach anatomy and physiology. He was a very fine instructor and

rendered a service to the school at that time, and for a number of years after, that was invaluable in laying a foundation for the establishment of osteopathy. His method of teaching was of such an impressionable type that one who listened to him could virtually look into the human body with his mind's eye and see all its numerous functions. Although we were handicapped so far as dissecting material was concerned, we were truly fortunate in having a teacher, in those first days, who was so capable of presenting all subjects in a practical, understandable way.

This original class numbered seventeen before the winter was over. The students came from various cities and towns. One young man came from California, one young woman from Sedalia, Mo., three students from Kansas City, one from Independence, Mo., two from Keokuk, Iowa, another from Davenport, one from Quincy, Ill., one from Texas, and one from Kansas. There were two homeopathic physicians (father and son) and Dr. Still's own family, consisting of Harry, Miss Blanche Still (now Mrs. George M. Laughlin) and a younger son, Fred Still, and myself. The class was composed of men and women of independent thought, people following their own intuitions. The ages of the members of this class ranged from eighteen to sixty-five years. Thus started the first class in osteopathy.

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The Instrument of our Distinction: The Hand

Charles J. Smutny, III

Sensing: A Biological Exploration Of The Macro And Microcosm

1. Sense Organs Of The Hand

It is convenient to look at the sense organs of the hand in a global fashion as a subset of the somatic sensory system according to the subsystem properties. There are four distinct somatic modalities of sensation each with their own subsets:

1. touch, elicited by mechanical stimulation of the epithelial layer (Mechanoreceptors)
 - a. superficial pressure
 - b. deep pressure
2. proprioceptive sensations, elicited by mechanical displacements of the muscles and joints (Mechanoreceptors)
 - a. static position sense
 - b. dynamic or kinesthetic sense
3. pain, elicited by noxious stimuli from friction or prick to tissue damaging events (mostly free nerve endings that are chemo or mechano receptive as well as polymodal; some mechanoreceptors are polymodal as well)
 - a. itch
 - b. tickle
 - c. varying degrees of pain from tingling to stabbing
4. thermal sensations, elicited by cooling or heating stimuli (Mechanoreceptors)

More complex sensations such as wetness, density, vibration, texture, etc. are learned at an association cortex level as a specific combination of the above components as a sensory event or a somato-sensory milieu experienced over time.¹ Specific receptor types are associated with unique ranges of sensation that often overlap other receptors ranges. (See figure 1)

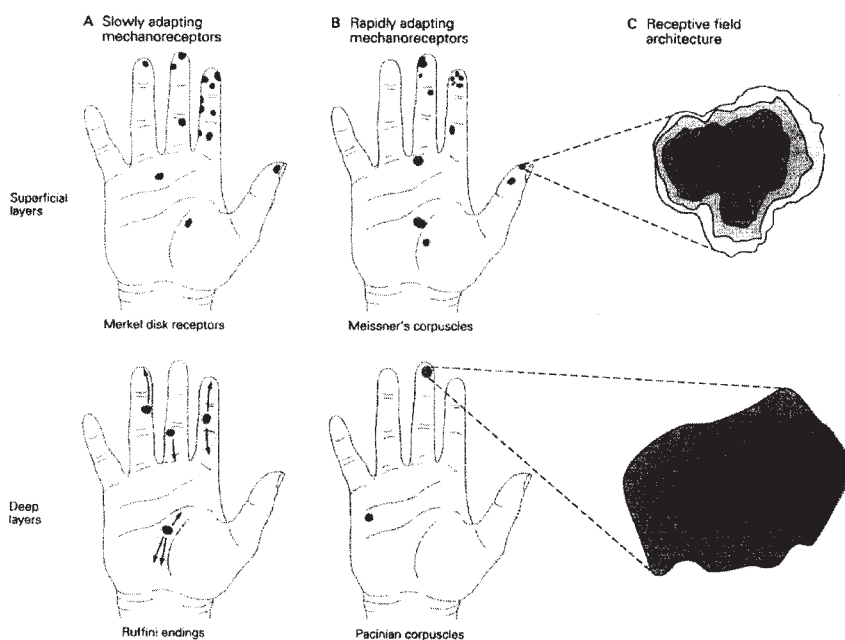
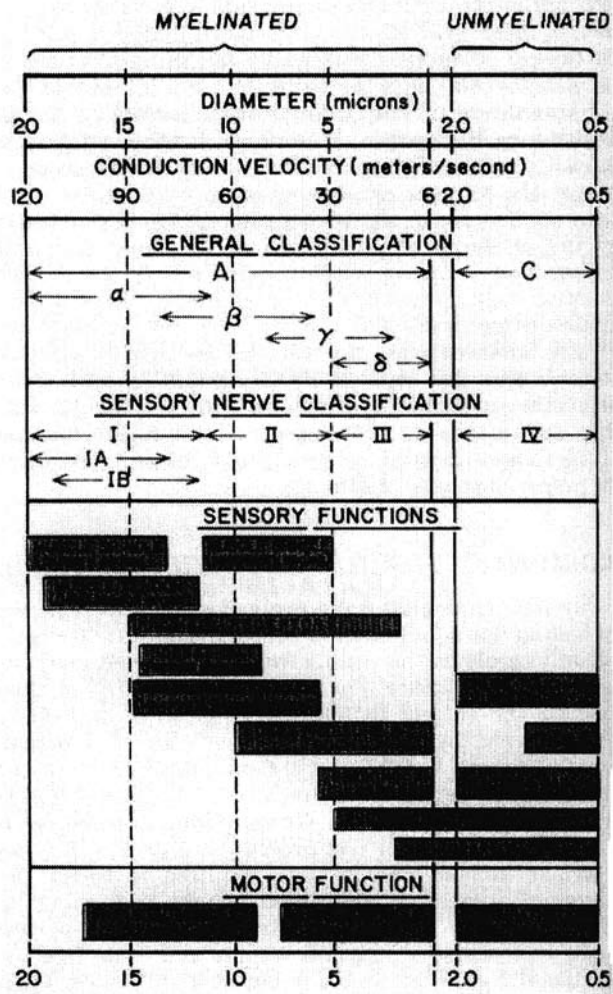


Figure 1. The superficial and deep layers of the skin are home to specific types of receptors whose fields overlap in this median nerve distribution. Slowly adapting receptors (A) have pinpoint accuracy. Merkel cells overlap a wide field array of direction sensitive Ruffini endings. Similarly, rapid adapting endings (B) Meissner's and Pacinian corpuscles divide the work of specificity and range respectively. The receptive field architecture (C) is also receptor specific. Deeper layers tend to have wider receptive fields in the hand, which may yield a greater array of instantaneous information. By providing point specific (surface) data temporally imbedded in a spectrum of wide field (deep) data that produces a sensory gradient the four sensor types can generate nearly an infinite degree of variation in reporting to the brain. This allows for a very high degree of precision in sensing the environment. Adapted from Principles of Neural Science 4th ed. chap. 22 figure 3 p 434



They are each associated with specific fiber types as well which become important in dysfunctions such as chronic pain. (See Table 1) They are distributed in the tissue in specific strata.

Merkle's cells are in the epidermis, below the epidermis Meissner's corpuscles, guard hair cells and down hair cells dominate while in the subcutaneous layers Ruffinian corpuscles, Pacinian corpuscles and Krause bulbs can be found. Free nerve endings can be found in all layers.^{2,3} (see figure 2)

2. Tactile Sensations and Archetypal Structures

Tactile sensations include touch, pressure, vibration, itch and tickle. These are primarily sensed through mechano-receptor organs. They convert mechanical actions to action potentials in the peripheral nervous system. They are utilized to sense both the internal and external environments and converge on the CNS at inter-neurons in the spinal cord.

3. Sensory Receptors

Mechanoreceptors mediate the sensation of touch by responding to the physical distortion of the body. Mechanoreceptors are specialized nerve endings that detect and transduce physical stimuli into changes in ionic conductance. Several types of mechanoreceptors are known, including free nerve endings, Merkel's disks, Meissner's corpuscles, Pacinian corpuscles, Ruffini endings and the hair follicle receptors. Each of these mechanoreceptors responds to different types of stimuli with varying receptive field size. (see figure 1)

Pacinian corpuscles consist of a nerve terminal with surrounding layers of connective tissue, mediate sensation of vibrations and high frequency (200 Hz) stimuli and rapidly adapt to stimuli. As the corpuscle is depressed, the physical pressure exerted upon the nerve terminal causes mechanosensitive ion channels to open, thereby depolarizing the membrane. If enough pressure is applied, an action potential is generated. As pressure is continually applied, the connective tissue accommodates and the terminal is no longer deformed and no longer fires action potentials.

Nociceptive pain fibers, such as itch and tickle sensation as well as pain fibers,

Table 1. Nerve classification and function demonstrates multiple level of overlap. Redundancy in a system provides clarification of data accuracy. Adapted from Guyton 7th ed. 48.8 p. 578.

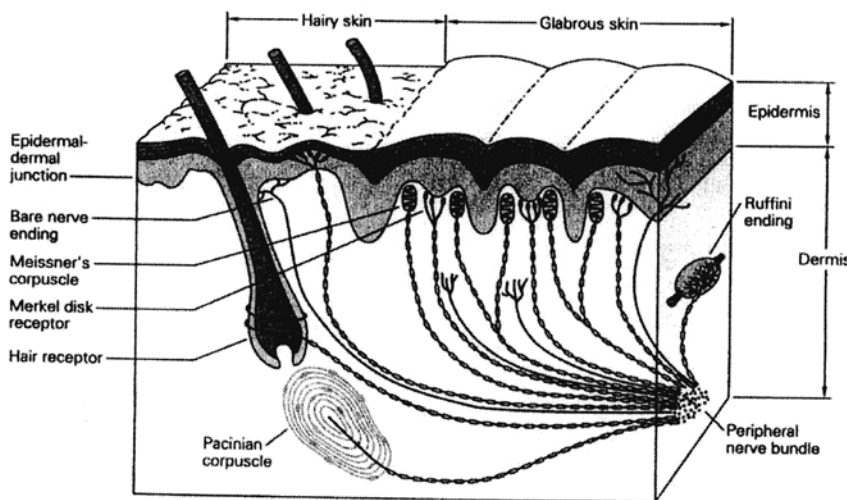


Figure 2. Distribution of nerve endings in skin layers. Adapted from Principles of Neural Science 4th ed. chap. 22 figure 2 p 433

Principle Sense Organs, Receptors and Modalities

Sense Organ	Receptor	Modality	Classification*	
Skin	hair follicle	hair movement	exteroceptors	
	unspecified	touch		
	unspecified	pressure		
	unspecified	warmth		
	unspecified	cold		
	unspecified	mechanical pain		
	unspecified	thermal pain		
Muscle spindle	annulospiral ending	muscle stretch	proprioceptors	
	flower-spray ending	muscle stretch		
Joint	Golgi tendon organ	muscle tension		
	free nerve endings	joint angle		
Eye	rod	vision	special senses	
	cone			
Ear (Organ of Corti)	hair cell	hearing		
Olfactory mucous membrane	olfactory neurone	smell		
Tongue (taste bud)	gustatory cell	taste		
Ear (utricle & saccule)	hair cell	linear acceleration		
Ear (semicircular canals)	hair cell	rotational acceleration		
Carotid sinus	stretch receptors	arterial blood pressure		interoceptors
Aortic arch	stretch receptors	arterial blood pressure		
Atria & great veins	stretch receptors	venous pressure		
Parenchyma of lung	stretch receptors	lung inflation		
	hypothalamic neurones	temperature of blood in head		
Aortic and carotid bodies	nerve endings (?)	PO ₂ in blood		
	chemoreceptors on ventral surface of medulla	pH of CSF		
	Hypothalamic neurones	osmotic pressure of plasma		
	Hypothalamic glucostat cells	arteriovenous glucose difference		
*This classification is based on the type and source of information. An alternate type of classification is based on adequate stimulus. In this case, the receptors are classified as mechanoreceptors, thermoreceptors, chemoreceptors and electromagnetic receptors.				

Table 2. Modified from Department of Physiology Website, McGill University

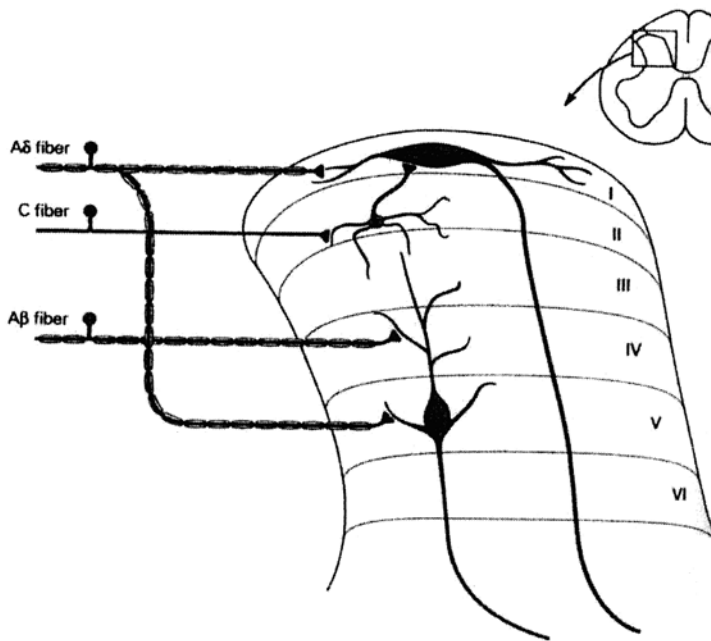


Figure 3. $A\delta$, C, and $A\beta$ fibers enter into different laminae of the dorsal horn synapsing with nociceptive specific interneurons. Projecting neurons (lamina I), Stalk cell neurons (lamina II), and wide dynamic-range inter neurons (lamina V) are interconnected within the dorsal horn providing feed back and feed forward potentials. Noxious stimuli are directly input to the outer layers while more sophisticated gradation and variation is input in or near lamina V. Visceral inputs also converge on lamina V. Ascending data from these interneurons travels predominantly in one or more of three pathways from here along the Spinothalamic, Spinoreticular or Spino-mesencephalic tracts. Smaller portions of the data ascend the Cervicothalamic tract or the Spinohypothalamic tract. Nociception is hard wired to nearly all areas of the brain impacting mood, attitude, activity, metabolism, etc. Nearly all neuro-endocrine-immune functions can be directly influenced by nociception. Adapted from *Principles of Neural Science 4th ed. chap. 24 figure 2. p 474*

are usually free nerve endings in both sensory environments and converge on inter-neurons in areas I, II, V, VII, and X of the spinal cord. (See figure 3)

Nociceptors mediate the sensation associated with painful stimuli. Nociceptors are generally free, unmyelinated fibers and can detect mechanical, thermal, chemical or multiple stimuli. Although nociceptors can respond to similar stimuli as other sensory receptors (e.g., mechanical stimuli), their response is relayed through separate pathways.^{4,5} Nociceptive fibers are segmentally distributed with overlap above and below the primary segment of innervation, which allows for both redundancy (back up of input signaling) and recruitment (a method of signal amplification when the system requires it).

Innate chemicals that activate or sensitize nociception can be released by tissue damage, endothelial linings under duress,

and other biochemical cascades that function normally as a balancing mechanism of the neuro-endocrine-immune homeostatic system. (see table 3)

Similarly endorphins, enkephalins and dynorphins of the endogenous opioid family can block nociceptive transmission. These neuro-chemicals operate in concert up and down regulating somato and viscerosensory pathways as a matter of course. Along the pathway the trip from periphery to cognition, an action has multiple potential gates for control beginning with wide dynamic array interneurons in the spinal cord to several key areas of the CNS determining responses. Spinothalamic routes engage thalamic nuclei that separate signaling to sensory cortex and to limbic systems. This leads to sensory awareness and neurological rapid response mechanisms (reflexes) and to emotional and endocrine responses that are integrated in the hypothalamic and

other limbic system nuclei. Extreme fear can gate all sensation of pain temporarily yet allow enhanced motoric action and heightened tactile sensory input until the fear has passed or consumed the individual at a conscious level.⁶

Other sensory fibers also utilize this system of pathways via the spinal cord interneurons and interact with the nociceptive system at multiple levels. Low threshold mechano receptors, heat receptors, cooling receptors, hair afferents, slow adapting fibers, rapid adapting fibers, and other receptor arrays add input to the CNS at the same set of interneurons. (Figure 3). Centralized processing via spino-thalamic tract, spino-reticular tract, spino-mesencephalic tract, spino-cervical tract, and the dorsal column help to separate information as it ascends and gates responses at various levels from the thalamus and below. Each area has interconnections via local pathways for enhancing or diminishing signal intensity (inhibition versus stimulation of the interneuron). In addition, each central level signals higher order neurons in the limbic system, sensory cortex, vestibular system and association cortex allowing for further gating or signal enhancement. Specialized end organs that transduce information into the system can be divided into several classes. (see table 2) Specialized nerve endings evolved to provide specialized information and yet there is significant overlap in their spectra of sensitivity to allow finer resolution. (see table 2) In addition, all these endings can generate pain signals under the correct circumstances. Studying their configuration (structure) yields some insight as to their specialized function. (see figure 4)

They are briefly described below.

4. Touch

Corpuscles of touch include, hair root plexuses, type I and type II cutaneous mechanoreceptors, lamellated corpuscles, and free nerve endings. These are further subdivided into two types of touch, *Crude touch vs. discriminative touch* that are separated by their speed of adaptation and their conduction velocity. *Meissner's corpuscles* and hair root plexuses are rapidly adapting and high speed. *Type I cutaneous mechanoreceptors, tactile or Merkel discs and type II cutaneous mechanoreceptors, end organs of Ruffini*

Substance	Source	Enzyme involved in Synthesis	Effect on Primary Afferent Fibers
Potassium	Damaged Cells		Activation
Serotonin	Platelets	Tryptophan Hydroxylase	Activation
Bradykinin	Plasma Kininogen	Kallikrein	Activation
Hystamine	Mast Cells		Activation
Prostaglandins	Arachidonic Acid-Damaged Cells	Cyclo-oxygenase	Sensitization
Leukotrienes	Arachidonic Acid-Damaged Cells	5-Lipoxygenase	Sensitization
Substance P	Primary Afferents		Sensitization

Table 3. Nociceptive sensitization sources and activities. Modified from Fields 1987 in Kandel and Schwartz 4th ed.

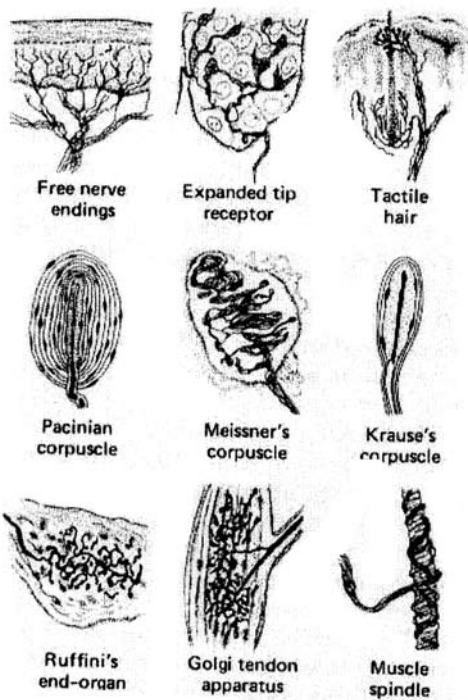


Figure 4. Morphological characteristics of some specialized sensory nerve endings. Adapted from Guyton 7th ed. 48.1 p 572, Guyton

are slowly adapting and lower conduction velocity but not the slowest.

5. Pressure, Vibration, Itch and Tickle

Pressure sensations are the result of stimulation of tactile receptors in deeper tissues. Stimulation has an important temporal component with input being longer lasting and with less variation in intensity than touch sensations. Pressure requires a larger surface area of

interaction than touch. Inputs to small surface areas are not consciously appreciated unless tissue damage occurs.⁷ The receptors for pressure are also type II cutaneous mechanoreceptors and lamellated (Pacinian) corpuscles. Like corpuscles of touch, lamellated corpuscles adapt rapidly but are of intermediate conduction velocity.

Vibration is sensed with rapidly repetitive sensory signals from tactile receptors and utilizes both corpuscles of touch and lamellated corpuscles. This allows for low and high frequency detection respectively. These frequency response ranges also overlap significantly. Itch and Tickle receptors are free nerve endings (Nociceptors) that are actually nerve endings crowned by a thin layer of Schwann cells without extensive wrapping of the typical Schwann cell. This provides for a dual function of transducing mechanical stimulation by piezo electric characteristics and sensitivity to the chemical environment (chemo receptor) by allowing rapid diffusion across the Schwann cell membrane. Typically Itch and Tickle responses cannot be self-elicited presumably because of gating from the cortex level.⁸

Thermal receptors detect changes in the temperature of the environment. They are either free nerve endings or a separate set of receptors that respond to hot and

cold stimuli (Krause Bulbs). Separate receptors within this group mediate the sensations of heat and cold. Warm receptors begin firing when the skin temperature rises above 30 °C, and increase their firing rate as the temperature reaches 45°C. Cold receptors fire when the skin temperature drops below about 35°C. Thermal receptors are particularly sensitive to changes in skin temperature.⁹

6. Pain Sensations and Phantom Pain

Pain receptors, also called Nociceptors, are predominantly free endings that exist in nearly every body tissue. They have very little adaptation character and are in the slowest conduction velocity range. Two kinds of pain are distinguished as *somatic*, (with superficial and deep components) and *visceral*. Visceral pain is unlike somatic pain and is usually felt in or just under the skin that overlies the stimulated organ. It can evolve over time to recruit dermatomal layers in the vicinity of the facilitated segment (referred pain).¹⁰

Phantom pain is the perception of pain in the zone of an amputated limb. The brain receives nerve impulses from the remaining proximal portions of the sensory nerves and interprets them as coming from the place where the limb was.

7. Proprioceptive Sensations

Proprioceptors provide information about the location of the body in space. This kinesthetic sense is due to receptors located in skeletal muscles, in tendons, around joints, and located in the inner ear. Muscle spindles and Golgi tendon

organs relay information about the length and tension of the muscles and tension of the tendons, respectively. Joints also contain mechanoreceptors that provide information about the angle, direction and velocity of limb movement as well as conveying impulses related to muscle tone and load. Signaling is directed to the autonomic nervous system and to multiple cortical areas. Body awareness, balance and equilibrium are regulated by the continuous interaction of these receptors signals.

8. Primary Afferents

Information from sensory receptors is relayed to the brain through the primary afferents. The primary afferents have cell bodies in the dorsal root ganglia and enter into the dorsal spinal cord. Information is segregated into two general pathways that carry touch, proprioception, pain and temperature sensation. These pathways project to different parts of the brain. Information from the mechanoreceptors mediating touch and body position are generally large, myelinated fibers, while axons that relay some pain and temperature information are usually unmyelinated fibers. These axons generally conduct stimuli at a slower rate than myelinated axons. Some painful stimuli are projected at faster rates to the CNS through myelinated axons from mechanical or chemical receptors. Primary afferent axons vary greatly in size and degree of myelination, which has formed the basis for categorization. Large axons from sensory receptors are myelinated

and designated A axons, while unmyelinated fibers mediating pain information are called C fibers. B fibers are myelinated and derive from the autonomic ganglia. Fibers from muscles and tendons are given Roman numeral designations (I through IV). C fibers conduct much slower than the larger A fibers, which is why we can detect or localize sensory stimulation before we take note of the pain associated with the sensation. The A group of axons can be subdivided further into four subgroups (alpha, beta, gamma and delta) based on their relative size and conduction velocity. A-alpha mediate proprioception from muscle, A-beta mediate mechanosensitive receptors in the skin, while A-delta mediate some pain and temperature information. (Table 4)

9. Dis-Inhibition Of Sensory Input As Pathology

Disinhibition is defined as the removal of an inhibition, which in a neurological sense means the allowance of a signal to be transmitted centrally and or to a reflex arc.¹¹ In pathology this implies that gating methods have been turned off allowing small signals to trigger cascades of events. This is protective to some degree if in reasonable amounts and over a short period of time. The result is *Hyperalgesia* (hyper-sensitivity to noxious stimuli), or *Alodynia* (sensation of pain to non-noxious or stimuli). Prolongation of this state can lead to central thalamic pain syndrome (pain that persists though the original damage has healed and there are no noxious stimuli being input).

10. Deliberate Dis-Inhibition Of Sensory Input As A Skill

It is possible to utilize the Gate system for the deliberate enhancement of sensory perception. Cortical control of gating can increase the degree of perception in a given field by “turning down the background noise” in other field of sensory input. This is most easily observed when an individual closes their eyes to improve hearing or tactile sensation. Turning down the noise and increasing the sensitivity is an important skill for the Osteopath to continuously train. By decreasing pressure and obtaining a state of extreme stillness, proprioceptive fields come more into focus and appear to be amplified. By increasing pressure the proprioceptive field appears to diminish while enhancement of tissue resistance perception occurs. Subtle changes in hand placement improve texture characteristics while diminishing proprioceptive feedback. Movement itself is better detected as the operator attains a quite position of assessment from a distance while engaging a fulcrum from which to proprioceptively relate further enhances the kinesthesia.

E. Molecular Nature Of Sensation

Recent research into the cellular structures that transduce information and convert it to neural impulses has shown that the nature of sensation is in fact molecular in scale. An article commenting on this type of research observes how little we know of sensation and cites new research attempting to explore and

Classification of nerve fibres					
*Group	**Type	Fibre diameter (μ)	Myelination	Conduction velocity (meters/sec)	Comments
Ia	A α	22	Heavily	120	motor-- large alpha motor neuron sensory-- primary afferents of muscle spindles
Ib	A α	22	Heavily	120	sensory-- Golgi tendon organ, touch & pressure receptors
II	A β	13	Heavily	70	sensory-- secondary afferents of muscle spindles, touch & pressure receptors, Paccinian corpuscles
	A γ	8	Heavily	40	motor-- small gamma motor neurons to muscle spindles
III	A δ	5	Lightly	15	sensory-- small lightly myelinated fibres, touch, pressure, pain & temperature

*Group I to IV fibres refer only to sensory fibres.
** Type A, B and C fibres refer to both motor and sensory fibres.

Table 4. Modified from Kandel and Schwarz Principles of Neural Science. (2nd Ed.) 294-300

define the molecular basis of one specific type of sensor.

"From a faint breeze on the back of the neck to a mosquito that alights on the arm, the body has a remarkable ability to detect even the slightest touch. Scientists have uncovered much about the physiological and anatomical mechanisms of this sense, but the details of how it works on a molecular level have remained largely unknown. Part of the difficulty stems from the fact that the nerve endings in question are extremely small. The findings of a study published today in the journal *Nature*, however, offer new insight. According to the report, researchers have identified a protein, known as BNC1, that appears to play an important role in a mammal's ability to sense light touch.

Michael J. Welsh of the University of Iowa and his colleagues decided to investigate BNC1 because it is the mammalian version of a protein belonging to a group of so-called ion channel proteins associated with touch-sensing in the roundworm *Caenorhabditis elegans*. Specifically, they studied the effects of deleting the BNC1 gene, which makes the protein, from a line of genetically engineered mice by comparing them with normal mice. Knocking out BNC1 resulted in mice that were greatly impaired in their ability to detect light touch. Without BNC1, the receptors that surround an animal's hair follicles malfunction, failing to trigger the nerve impulse that tells the brain that the hair has been moved. Yet because they did not lose that ability altogether, Welsh remarks, "We postulate that the BNC1 channel may be one component of a larger receptor complex. In the absence of BNC1, other components of the channel may retain sufficient function for some residual sense of light touch." The location of the BNC1 protein also hints at its role. "We found the protein located in fibers that surround the hair shaft like a picket fence," he observes, "so when a shaft of hair bends in any direction, these fibers are deflected." "I think this is an important first step toward understanding this elusive sense of touch," Welsh asserts. "Now we need to look at other members of this family of ion channel proteins, as well as the proteins that associate with these channels."¹²

The abstract cited above is a sample of how the scientific community is only now beginning to explore the mechanics of sensory transduction.

Of the vertebrate senses, touch is the least understood at the molecular level. The ion channels that form the core of the mechanosensory complex and confer touch sensitivity remain unknown. However, the similarity of the brain sodium channel 1 (BNC1) to nematode proteins involved in mechanotransduction indicated that it might be a part of such a mechanosensor. Here we show that disrupting the mouse BNC1 gene markedly reduces the sensitivity of a specific component of mechanosensation: low-threshold rapidly adapting mechanoreceptors. In rodent hairy skin these mechanoreceptors are excited by hair movement. Consistent with this function, we found BNC1 in the lanceolate nerve endings that lie adjacent to and surround the hair follicle. Although BNC1 has been proposed to have a role in pH sensing, the acid-evoked current in cultured sensory neurons and the response of acid-stimulated nociceptors were normal in BNC1 null mice. These data identify the BNC1 channel as essential for the normal detection of light touch and indicate that BNC1 may be a central component of a mechanosensory complex.^m

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CME QUIZ

1. The somatic sensory systems four distinct modalities of sensation include which of the following:
 - a. Touch, proprioception, nociception (pain), thermal
 - b. Nociception, proprioception, pressure, vibration
 - c. Proprioception, vibration, pinprick, thermal
 - d. Nociception, vibration, thermal, proprioception
 - e. Vibration, pinprick, thermal, two point discrimination

2. Simultaneous sensation in overlapping zones of receptor fields allow for unique combination sets to provide distinctive sensory information (wetness, texture, etc.) that is interpreted and learned in the
 - a. Neocortex
 - b. Amigdala
 - c. Hippocampus
 - d. Association cortex
 - e. Thalamic nuclei

3. Nociceptors (pain receptors) are generally free, unmyelinated fibers that can detect mechanical, thermal and chemical stimuli. They can be sensitized (lowering the pain threshold) as opposed to activated (triggered) by which of the following:
 - a. Bradykinin, Histamines, Leukotrienes
 - b. Leukotrienes, Prostaglandins, Serotonin
 - c. Potassium, Substance P, Prostaglandins
 - d. Potassium, Serotonin, Bradykinin
 - e. Prostaglandins, Leukotrienes, Substance P

4. Disinhibition is the removal of inhibition or gating of sensory input. Pathologically this can lead to hyperalgesia, allodynia and ultimately to a centralized or thalamic pain syndrome (chronic regional pain syndrome or the old name Regional Sympathetic Dystrophy (RSD) where the only remaining pathology is super sensitized central nervous system pain neurons. Non-pathological utilization of this phenomenon can be practiced (learned) as a method of increasing sensory precision. Using the above information, which basic Osteopathic discipline specifically is a practice of increasing kinesthetic awareness.
 - a. Muscle Energy
 - b. Counter Strain
 - c. Osteopathy in the Cranial Field
 - d. Myofascial Release
 - e. High Velocity Low Amplitude

5. Cellular cyto-architecture has recently been discovered to have a molecular basis for sensation that appears to be evolutionarily ancient. The sensitivity is extraordinary and may account for our ability to experience the "pressure of a mosquito landing" or walking on our skin. BNC1 is a cellular protein that is a molecular equivalent of a mechanoreceptor that is associated with a specific BNC1 gene. Mouse hair cells (mechanoreceptors) are surrounded by BNC1 molecules (providing clear evidence of the extreme sensory potential of a single mechanoreceptor). Science is beginning to prove that sensory transduction:
 - a. is far more precise than previously thought
 - b. is far less precise than previously thought
 - c. is moderately precise as previously thought
 - d. is clearly understood and well defined
 - e. is clearly understood and poorly defined

*Answer sheet to
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 will appear in the
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**June 2005
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 quiz answers:**
 1. E
 2. A
 3. C
 4. B
 5. E

Anatomy in the Osteopathic Field

Steve Paulus

*We know that if we are ever to know the whole, we must first know the parts.*¹ . . . A. T. Still

Holism and anatomy are inextricably linked in osteopathic philosophy. Andrew Taylor Still taught the osteopathic profession how to access what is holistic in our patients, by way of the parts. “The parts” referred to by Dr. Still are the details of anatomy. He invited us to be proficient in anatomy and he emphasized the significance of a lifelong study of anatomy as a pathway to clinical excellence and success.

Perhaps the word “invited” is insufficient to describe the emphasis Dr. Still placed upon knowing anatomy in osteopathic practice. Dr. Still **implored** us to prioritize anatomy. His request was more of a requirement when he said, “The osteopath must remember that his first lesson is anatomy, his last lesson is anatomy and all his lessons are anatomy”²—he further emphasized his anatomic priority by stating, “In early life, I began the study of anatomy, believing it to be the “alpha and omega,” the beginning and the end, of all forms and the laws that govern forms...”³—and finally, he drove his point home with, “. . . let your morning, noon, and evening prayer be this, Oh Lord! Give me more anatomy each day I live, because experience has taught me the unavoidable demands when in the “sick room.”⁴

Dr. Still **demand**ed that every osteopath have an intimate knowledge of anatomy. Dr. Still’s appreciation of anatomy was not two-dimensional, as imparted from anatomy textbooks. His appreciation of anatomy was living, functional, and applied. His knowledge of anatomy was ultimately practical and meant to be utilized every day by practicing osteopaths in what he called the “sick room,” or what we today call our treatment rooms.

I don’t imply that we should give up the study of anatomy by using textbooks or atlases. Dr. Still considered anatomy textbooks to be the true osteopathic reference books that guide our treatment. He also required that osteopaths learn the basics of three-dimensional anatomy from dissection. He was a master anatomist who dissected hundreds of bodies. He said, “I had printed books, but went back to the great book of nature as my chief study. The poet has said that the greatest study of man is man. I believe this, and would have believed it if he had said nothing about it. The best way to study man is to dissect a few bodies.”⁵

We learn the distinctive language of anatomy from textbooks. We appreciate the intricate three-dimensional relationships of anatomy through the vehicle of dissection. We then relate this masterful knowledge of anatomy to the living form presented to us – as a patient – when we utilize the hands-on method of treatment known as osteopathic manipulation.

The development of a successful and skilled osteopath requires a lifelong commitment to increasing our anatomic knowledge through the study of textbooks and to expanding our understanding of the living anatomy presented to us by the practiced application of osteopathic manipulation. We learn to understand how anatomy works through offering osteopathic treatment to tens of thousands of patient visits over the lifetime of our careers. Dr. Still said, “. . . you begin with anatomy, and you end with anatomy, a knowledge of anatomy is all you want or need, as it is all you ever will use in your practice, although you may live one hundred years.”⁶ His imperative is as essential today as it was in 1892 when he wrote these words.

A deliberate understanding of anatomy guides our hands during osteopathic treatment. Osteopathic skill and clinical acumen are based upon a detailed appreciation of structure. The more exact our anatomic knowledge, the more precise is the treatment. Precision increases the likelihood of positive outcome. Osteopathic manipulation is fundamentally an applied anatomic treatment.

Dr. Still often spoke of having a “living picture”⁷ of the patient’s structure in our “mind’s eye.”⁸ He spoke practically of having our “minds full of pictures of the normal body”⁹ and of having an “image of every bone, muscle, nerve, organ, and part of the human body.”¹⁰ Discerning normal structure from abnormal structure is indispensable in any discussion of *Anatomy in the Osteopathic Field*. Having an image of a patient’s living anatomy is not a mental picture created by one’s imagination. The picture in our mind’s eye is not conjured up to fashion a normal anatomic template for us to fit our patients in to. As osteopaths, we **receive** the living picture **from** our patients. The information we receive through our osteopathic physical exam combined with the data given to us from the history create the mind’s eye image. The mind’s eye image is a diagnosis. We use this living picture of a patient’s structure to then offer a patient-specific treatment.

Understanding anatomy is not merely concerned with learning the statistics of detail. It is not just knowing the names of parts. It is not exclusively obedient to recognizing the material elements of structure. *Anatomy in the Osteopathic Field* is concerned with structure and function. Function includes the “living” aspect of our patients. A cadaver does

not contain function. The non-material qualities of function also allow us to find relationships, or connections, that are clinically significant. Function and structure together make a unified whole. Function and structure are interdependent and inseparably related.

What is the relationship between Dr. Still's osteopathic vision of anatomy and holism? A. T. Still did not coin the word *holism*. J. C. Smuts, a South African scholar in 1926, conceptualized holism. In his book, *Holism and Evolution*, Smuts created the word *holism* from the Greek word *holos*, which means whole.¹¹ He then outlined the philosophy of holism, which reiterates Aristotle's philosophy of "the whole is greater than the sum of its parts." According to Smuts, the mechanical putting together of parts does not account for the characteristics or functioning of a living and unified holistic human being. He described holism as a universal phenomenon and a recognizable expression of nature.¹² Later in the 1960s, many authors revitalized J. C. Smut's theories on holism and integrated them into the alternative health care movement.

Though Dr. Still did not use the word holism, he did euphemistically speak of holism. In other words, he spoke of holism without using the word holistic. He used expressions, or what we might now call key-words, such as those listed below:

The human body as a whole

Connected oneness

One common Whole

Harmony and harmonious action

The body functioning united

The whole being, the whole person, and the whole body

United in form

Man in his completed form

The university of fascia

Dr. Still said, "I do not claim to be the author of this science of osteopathy. No human hand framed its laws. I ask no greater honor than to have discovered it."¹³ A. T. Still did not invent osteopathy. J. C. Smuts did not invent holism. Osteopathy and holism are known functions of the natural world.

When Dr. Still said, "We look at the

body in health as meaning perfection and harmony, not in one part, but as the whole."¹⁴ He was telling us that health, perfection, and harmony are some of the characteristics of holism. By perfection, I believe Dr. Still intended the word to be defined as "mankind's highest good." He implied that, we couldn't mechanically put together the parts and then achieve harmony. Dr. Still was a master at discovering the interrelations between the material elements to discover how the whole mechanism is affected. Holism can be accessed either by means of the structure or form, as in contacting the "universality of the fascia," or by non-material phenomena associated with function, as in perceiving the unifying matrix of Health.

Dr. Still was ultimately a student of Nature and Natural law. Nature is inherently holistic. Holism is a concordant function that cannot be measured but can be appreciated. We appreciate what is holistic, in our patients, as a field, or a matrix, engaged by what I call our "other sensory perceptions."¹⁵ We don't utilize the material neurologic end-organs of our five known senses when experiencing the matrix of holism; instead, we have an awareness of function that manifests oneness, unity, completion, and universality.

This field of health, perfection, and harmony can manifest with many different textures. What is holistic in our patients is the originator of the therapeutic process. Healing does not emerge from what is diseased or dysfunctional. Healing is an effect of what is right or healthy in the organism. The physiologic "highest good" is an aspect of what is holistic. Holism is synonymous with the osteopathic principles of health.

Osteopathic manipulative treatment is the hands-on application of osteopathic philosophy. Osteopathic manipulation is the most common, but not the only vehicle through which a DO gains access to, and experiences holism. Until we put our hands on a patient in a caring and therapeutic way, we have no dependable experience of holism. Before we put our hands on a patient, holism is an idea; up to that point, it is for the most part only accessible through our consciousness. We can think osteopathically. We can discuss osteopathy philosophy verbally. However, until we place our hands on

a patient – until we touch our patients – what is holistic cannot be fully accessed and then utilized as the motive force for healing.

Osteopathy is a hands-on system of health care. Osteopathy is a physically based healing art that uses the body as a doorway to the non-material or esoteric healing phenomena. Osteopathic Manipulation translates an idea into action. The action we understand is the appreciation of harmony, unity, completion, and universality. When these expressions of holism are not perceived, we "see" with our hands the presence of inharmony, disintegration, incompleteness and discord, which are manifestations of disease and fractionation.

From an osteopathic perspective, the opposite of holism is when a patient feels fractionated to us during the examination and diagnosis phases. When we place our hands on a patient and do not feel harmony, then disease and dysfunction are present – or the preclinical manifestations of disease are in the earliest stages. The true goal of an osteopathic treatment is to help restore the organism to holism. Once harmony, unity, completion, and universality are restored then nature's inherent abilities to heal do the rest.

The conscious and wise application of osteopathy is extremely simple. We must identify the dysfunction, during our physical exam; and this requires having a detailed understanding of normal structure and the functional anatomy we call physiology. Then, we must identify some quality of holism. I commonly utilize the matrix of health as a readily accessible unifying phenomenon. Skilled osteopathic treatment involves just bringing together what is holistic with what is dysfunctional. Finally, we leave nature to do the rest. The ultimate source of healing is nature. The osteopath is present only to assist nature.

Our mission as osteopaths is to have a consummate understanding of applied anatomy. Our duty as osteopaths is to be able to find what is holistic and utilize it as the motive force for healing. I believe that the most important philosophic tenet imparted by Dr. Still was summarized in this quote, "To find health should be the object of the doctor. Anyone can find disease."¹⁶ Health is holistic. Health is one of the accessible and perceivable fields of holism.

Our motto should be to study anatomy

and find health. That is all we need to know to become a skilled and successful osteopath.

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The Art of High Velocity Low Amplitude Osteopathic Manipulative Treatment

Robert C. Clark

Abstract

Current osteopathic students and graduates seem less comfortable with high velocity low amplitude (HVLA) techniques than their predecessors. This essay attempts to analyze why this is so. It gives 14 recommendations on how to make HVLA techniques easier for the student and/or practitioner.

Recent articles and position papers in the osteopathic profession raise a specter of risk regarding high velocity low amplitude (HVLA) technique especially in the cervical region. As a moderate term practitioner of 25 years, I have had the good fortune to have few problems with HVLA. The worst effects were a cracked rib or a dizzy patient. My contemporaries and seniors have little problem with HVLA but many of our younger practitioners and students do have major concerns and even fears.

*The question is:
why do such concerns exist?*

The answer is multifaceted including:

- 1) fear of litigation
- 2) insecurity or lack of technical confidence
- 3) educational dilution.

Let us begin with the last item on this list: educational dilution. When I was a student we did soft tissue, lymphatic pump, rib-raising and then we started finding and treating dysfunction, we used HVLA for most of our two years. As a result we were excellent at HVLA. For my class muscle energy technique, and sacrum/pelvis treatment were two-three weeks total. Cranial was a sophomore two semester elective on our own time.

Now we teach a broad spectrum of

techniques with the result that students are capable of addressing more challenging cases than we were but they can barely do HVLA.

We have a greater range of treatment techniques taught in roughly the same time as before. There are more skills learned, but the level of mastery is less, hence an educational dilution.

Obviously the next question is: How do we fix this? I do NOT want to give up the broad range of techniques. We need more OMM instruction, not less. We need to get our profession and colleagues more serious about OMM training in the clinical years and the postgraduate years. How this could or should be done is another essay.

Fear of litigation requires a major political change and some changes are occurring.

Technical insecurity or lack of confidence can only be addressed by practice and successes that gradually build confidence. In order to give students more practice I have been coordinating an HVLA study group for the past two years.

The group is an elective for two hours a week in the sophomore year. It meets every week when classes are in session. With the help of my students I have learned a lot. My patients are telling me that my technique has improved.

WHY?

Realizations of several things that I was unconsciously doing started me on the path of HVLA awareness.

Once on the path I have changed elements of my teaching to make HVLA skills easier to learn. I also see students learning better and developing the necessary confidence to become highly skilled.

A surprising result has been that I teach less HVLA in the study group than

either the students or I expected. I teach more Osteopathy. A big part of the study group is perfection of observation skills and enhancing body control and tissue handling skills.

What follows are 14 elements of HVLA awareness that I believe are essential for skilled and effective HVLA technique. These concepts will help with other technique methods as well.

1. Attitude - I was taught you just do it! Today students preface every attempt with "I am not good at this, I am not confident in this, I am afraid I might hurt my patient." This attitude is a recipe for guaranteed failure. It has been said, "what you think is what you get!" Attitudes and thoughts such as those listed focus the doctor on one thing: Treatment Failure. Change your mind set to "I am going to help this person." William Wyatt, D.O. once told me that when he treated he always was thinking - "here is the dysfunction and its barrier, I am going to fix it for this person." This is an attitude for success.
2. Distance - It seems many students are afraid of their patients so that they do a treatment from afar. It does not work! In HVLA, close contact with the patient is critical.
3. Precision - My biggest patient weighed over 350 pounds and was a student's spouse. When he came to a practice session, she asked help in treating. I chose muscle energy for his Cervico-thoracic area and treated him by positioning precisely and then used only fingertip pressure to evoke the muscle energy response. Moral: never muscle a muscle man. Second Moral: even someone good at HVLA cannot treat everything with HVLA.
4. Mass Not Strength - A common

failure in HVLA is to try to use strength to move a restrictive barrier. This is guaranteed failure for most doctors. The correct strategy is getting “up close and personal” and let the doctor’s body mass do the work. In sports, coaches teach players to look where they want the ball to go. This forces the players to have a target and align their bodies “behind” the ball and aim the body the way the ball is to go. The same is essential in HVLA. If the Doctor’s mass is not aimed the right direction the segment will not move!

5. **Really** engage the barrier: Anyone can do a basic flex, sidebend right, rotate left (or whatever) and get the general direction of the barrier. But to **really** engage the barrier the last part of the process requires fine-tuning all vectors. Watch a doctor good at HVLA technique and notice first a general set up towards the barrier and then a squirm or wiggle in all the planes to get closer and closer to the barrier. These doctors almost always succeed because they engage each barrier vector fully and precisely, **not generically**.
6. Have a place to move the barrier: barriers are an intellectual construct for descriptive purposes. Part of the construct missing in all textbooks is Barriers are three dimensional. Another part of the construct that is missing is there is only one way that the barrier can be moved with the Impulse. If the direction one seeks to move the Restrictive Barrier is wrong, then the doctor converts a restrictive barrier into an anatomical barrier. Analogy: a door with a crash bar. The door is the restrictive barrier. A person can push the crash bar from any direction but only one direction of force unlatches the door and allows it to open. The same is true in HVLA and all OMT.
7. HVLA - Thrust vs. Impulse - Greenman suggested the term Impulse I think it is a good term. It suggests a moment of force that travels into and through the Barrier. There is also the implication of short duration or moment. Thrust instead makes me think of throwing a spear as hard as possible and with a lot of follow

through. Shock blanks the CNS. The CNS “inventories” body posture and spindle settings when it “wakes up.” HVLA does the same but is more focused and lasts a shorter time. A good example is crushing a pop can (empty). Set the can upright on the floor. Step on it carefully. Then use an impulse to crush it. If done correctly, the can collapses on itself.

8. Strike fast - Speed is everything. Speed of impulse is critical - the doctor has to be fast enough to theoretically not trigger a stretch reflex. Speed is required for an impulse to set up the human equivalent of a shockwave that travels through the body to the barrier and moves it. Anything less is the biomechanical equivalent of a hand slap. No focus, no speed causes lots of spasm and pain for the patient. I believe that the speed of good HVLA is so fast that the Doctor Impulses and exits before a stretch reflex can trigger.
9. “Don’t use a bigger hammer! But first be sure you use one that is big enough” My dad always told me, “use the proper tool for the job.” The minimum force used has to match or slightly exceed the resistance in the restriction and the structures to be mobilized. Any lesser force will be inadequate. But any more force is excessive and potentially injurious. Obviously, if the resistance encountered seems insurmountable refer to numbers 3 & 5 again. You are against the wrong barrier and your localization is imprecise!
10. Don’t leave ’em there! - In other words whether the HVLA treatment is aborted, fails or succeeds do not stay in that position unless you want to create a new dysfunction! Quickly but smoothly return the patient to a neutral straight body position.
11. Keep control - I’ve been accused of having control issues. For OMT control is vital - If I do not have control of both the patient’s body and my body then I can never localize the barrier and aim myself in the proper direction or administer a corrective force.
12. Stop thinking - Yes, you just read, “stop thinking.” I have noticed people who are having a hard time

with HVLA are thinking too much. Do your thinking before you start the actual treatment. Kinesthetic skills need open and uncluttered minds to feel. Let touch be the means of communication between you and the patient. Cleanse your mind and let your patient show you the way to go.

13. Firm but relaxed. A seeming contradiction of HVLA is the doctor needs a relaxed touch but at the same time a firm or strong grip to hold on and cause fine movements. Relaxed lets you feel, firm keeps you focused and in control.
14. “Try - try say you, Try not - **DO** or Do Not! - A “Yodaism” but very true - It all comes back to attitude. You choose to succeed or you choose to not succeed.

Summary

In conclusion, my patients tell me that my technique is better. They say it feels better. I am successfully and **easily** treating dysfunctions that were very difficult before. The really stuck dysfunctions take less effort. Patients are saying, “wow, it never moved that direction or that easily in the past.” My treatment style is as eclectic as before, but with ever improving technique, I am getting more done in less time.

Additionally, my students who make the effort and apply these elements of great HVLA technique become more confident and better with HVLA technique as well as with their other treatment techniques. With their enhanced skills and confidence, several students have made the astounding transition from medical students who know osteopathic manipulative treatment to real budding osteopathic physicians or to the real old timers in the group - osteopaths, whose skills would make Dr. Still proud. □

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Lower Extremity Edema: A Case Report

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Introduction

Edema is defined as a clinically apparent increase in interstitial fluid volume.¹ It is not a disease, but rather a symptom of another underlying disease process which alters the fundamental mechanics of the circulatory-interstitial-lymphatic fluid model. As such, one cannot diagnose edema without first defining the cause. The case described herein illustrates a possible cause of edema and provides a point from which to further explore the physiology, pathophysiology and treatment of lymphatic system dysfunction.

Case Report

Chief Complaint:

D.W. is a 53-year-old African-American female referred to the osteopathic manipulative medicine clinic by her primary care physician with complaints of left ankle pain and swelling.

History of Present Illness:

On the day of initial presentation, D.W. had been having the above mentioned pain for approximately 6 months. She related that she is weak on her left side since an "aneurysm ruptured in her brain" and resulted in a cerebrovascular accident 2 years ago. On the day of the injury, her weakness caused her to lose her balance and she fell onto her left side and fractured her left ankle, "in 3 places." She has experienced constant pain since that time. She describes the pain as dull, aching, and sometimes burning; it is located on the lateral side of her left ankle, in the region of the lateral malleolus. She rates the severity as 8 on a scale of 10. It is aggravated when walking, standing, or placing any weight on her left leg and only partially ameliorated when sitting or lying down and in a non-weight-bearing position. After her fall, fracture and surgery, she wore a walking boot for support and she still wears it from time to

time to alleviate her pain, but this rarely helps. She has also taken hydrocodone (Vicodin) in the past for her pain with some relief.

She has noticed her left ankle and lower leg swelling on and off since the time of her accident. It is usually worse toward the end of the day and seems to be a little better in the morning – it never seems to be the same size as her right leg and ankle, however. She has not noticed similar swelling in her right lower extremity or any other region of her body.

Past Medical and Surgical History:

In addition to the above mentioned aneurysm and consequent cerebrovascular accident, D.W. has a personal medical history which includes hypertension, obesity, hepatitis C, anxiety disorder, and seizures. Her surgical history includes brain surgery to repair her ruptured aneurysm, an open reduction and internal fixation of her left ankle, and a total abdominal hysterectomy.

Family History:

D.W.'s family history is significant for breast cancer, hypertension and diabetes mellitus in her mother and liver and pancreatic cancer, diabetes mellitus, and coronary artery disease in her father.

Past Traumatic History:

D.W. does not recall any significant past history of traumatic events with the exception of the fall which caused her above noted ankle fracture.

Allergies and Medications:

D.W. has no allergies to pharmaceutical products and reports no significant environmental or food allergies. Her current medications include diazepam (Valium) 10mg po BID, olmesartan (Benicar) 40mg po QD, amlodipine (Nor-

vasc) 10mg po QD, phenytoin (Dilantin) 300mg QAM and 200mg QPM, cod liver oil, and hawthorn.

Social History:

Since her stroke 2 years ago, D.W. has been medically and physically disabled. As such, she is currently unemployed. She has a past history of heroin and cocaine use, from which she has abstained for the past 11½ years. She currently smokes 1 pack of cigarettes a day and has done so for the past year; she denies the use of alcohol or current use of illicit substances.

Physical Exam:

General: D.W. is a well developed, well nourished, obese female in no apparent distress who appears older than her stated age.

Skin: Warm, dry and intact. No rashes, lesions, or open wounds are noted on the skin.

HEENT: Atraumatic, normocephalic. Extraocular movements are intact, pupils are equal, round, and reactive to light. No scleral icterus or conjunctival injection noted. The nares are patent and without discharge. There is no septal deviation or perforation. Oral mucosa is pink, moist and intact. A few dental caries are present. No pharyngeal injection or inflammation is noted.

Neck: Trachea is midline. The thyroid is not palpable. Range of motion is adequate in flexion, extension, side-bending and rotation. No adenopathy is appreciated.

Chest and back: Symmetric in inhalation and exhalation. Multiple areas of somatic dysfunction are appreciated in the upper, mid-, and lower back. The right 1st rib is found to be elevated and there is associated anterior scalene muscle spasm. There is paraspinous muscle tightness and tenderness in the lower thoracic

and lumbar spine. L₃ and L₄ are found to be S₁R_R. The left iliolumbar ligament is tight and tender and there is left-sided sacroiliac dysfunction as well. The right pelvic innominate is rotated anteriorly.

Cardiopulmonary: Lungs are clear to auscultation in all lung fields and the heart is noted to be in a regular rate and rhythm. There are no murmurs, rubs or gallops. Pulses are present and equal in both upper and lower extremities. There are no bruits in the carotid or renal arteries.

Abdomen: Obese, soft, nontender with normal bowel sounds. No masses or organomegaly appreciated.

Extremities: Multiple areas of somatic dysfunction are found in the left leg. There are 10-15 tenderpoints in the left tensor fascia lata. The popliteal space on the left is boggy, edematous, and tender. There is 2+ pitting edema of the left lower extremity as well, with concentric swelling from mid-calf to the toes. Sensation is intact to gross examination. Strength of the left upper and lower extremity is less than that of the contralateral side, with the left leg being the weakest of the extremities.^{4,5} The left lower interosseous membrane is also restricted in motion.

Neurological: Cranial nerves II-XII are intact to gross inspection. There is no gross cerebellar deficit noted as there is no tremor or past-pointing present on exam. Deep tendon reflexes are increased in the left upper and lower extremities, but without clonus. The left lower extremity is in extension posture as would be expected after a CVA.

Breasts and Genitals: not performed

Literature Review

There is, in actuality, a paucity of literature on the use of osteopathic manipulative treatment (OMT) in the management of edema. A search of OstMED using the terms “edema” and “osteopathic manipulation” reveal 41 entries, of which 2-3 are directly useful. The majority of these are short anecdotal case reports and do not add to the scientific base of osteopathic or general medical knowledge. An OVID medline search using the same search criteria yield no results whatsoever. A similar search, substituting “massage” for “osteopathic manipulation” yields 11 results, of which only 2 are remotely useful, although none of the results deal directly with the questions posed by this case.

Discussion

As was noted above, edema results from an increase in the interstitial fluid volume and is manifested by increased tissue tension and weight gain. Edema may be generalized (over the entire body) or localized (as in this case).¹ Before discussing the pathophysiology of edema, it may be useful to first discuss the normal anatomy and physiology of the lymphatic system.

Anatomy of the lymphatic system.^{3,8}

The lymphatics, also referred to as the second circulatory system of the body,⁸ are a vascular system composed of three distinct components: organized lymph tissues, collecting ducts, and lymph fluid.

Organized lymph tissues include the lymph nodes, the spleen, the tonsils, the thymus, the vermiform appendix, and the visceral lymphoid tissues in the gastrointestinal tract.

The spleen is the single largest mass of lymphoid tissue, averaging 12cm in length and 7cm in width. It is an intra-abdominal organ located in the left upper quadrant of the abdomen, anterior to ribs 9-11 and inferior to the thoracoabdominal diaphragm. It serves to filter defunct blood cells and opsonized bacteria from the blood stream. It also is a major site for the production of immunoglobulins in the body and a site of hematopoiesis in utero.

The thymus is located in the anterior compartment of the mediastinum. In utero and during the first few years of life, it may extend inferiorly from the anterior neck and completely surround the anterior surface of the heart. It generally atrophies and involutes as one ages, however. It is involved in the preprocessing and maturation of T lymphocytes, which are responsible for organizing and controlling cellular immunity.

The tonsils are a ring of lymphoid tissue surrounding the oro- and nasopharynx (Waldeyer's ring). They are the gatekeepers of the gastrointestinal tract and make up the first line of defense against infection in the gut.

The appendix is a worm-like structure in the right lower quadrant of the abdomen attached to the cecum. It varies in length from 2 to 20 cm in length and consists largely of lymphoid tissue. The

function of the appendix is unknown, but is generally believed to be a vestigial remnant from our ancestral relatives.

The lymphoid tissues in the gastrointestinal (GI) tract are the most organized of all visceral tissues. In the small intestine, lacteals are found within each villus and Peyer's patches are found most frequently in the distal ileum. These structures are responsible for the absorption and transport of fatty acids through their rich network of lymphatic vessels, as well as being involved in the immune response to GI pathogens.

The lymph nodes are located along the tracts of lymph vessels. They are involved primarily in the filtration of lymph fluid. Lymph nodes can be divided into two groups – superficial and deep. Superficial nodes are located in the subcutaneous tissues and are accompanied by superficial veins. The deep lymph nodes lie beneath the fascia and muscles and accompany the deeper blood vessels. They may also be found surrounding every major organ in the body. Each kidney-bean shaped lymph node has a connective tissue capsule, within which are cortical and medullary regions. Lymph is brought to the lymph node via afferent vessels which attach to the node on the convex side. The fluid is filtered through the cortex and medulla where macrophages and reticuloendothelial cells remove impurities and antigens from the fluid for processing by the immune system. The fluid exits the node via the efferent lymph vessel, found within the hilum of the node, along with an artery and a vein.

The collecting vessels are vital to continued survival. If the entire lymphatic system were to stop functioning, one would die of massive edema and the buildup of toxic metabolites and wastes in less than 24 hours. Lymphatic vessels permeate almost every tissue of the body. Notable exceptions include the central nervous system, the epidermis and the bone marrow. Lymphatic collecting vessels begin in the tissues as blind endothelial tubes, or lymphatic capillaries. These lymphatic capillaries are composed of a single-layer of squamous epithelium without a basement membrane. They are attached to the surrounding tissues via anchoring filaments. These filaments help keep the capillaries from collapsing and also help open the pores between

the cells and allow for larger particles to enter the tube.

Lymphatic capillaries coalesce to form capillary plexus and then on to form larger trunks. These regional trunks are responsible for draining individual body parts, and eventually drain into the two main trunks of the body – the right lymphatic duct and the thoracic duct (or left lymphatic duct). The regional trunks of the pelvis, lower extremities and abdomen drain into the cisterna chyli, a sacular out-pouching of the thoracic duct below the thoracoabdominal diaphragm, just adjacent to the abdominal aorta at the level of the L₁-L₂ lumbar vertebrae. The thoracic duct ascends through the aortic diaphragmatic hiatus and enters the left thoracic outlet where it finds its final destination at the convergence of the left brachiocephalic and subclavian veins. As it traverses the distance from the abdomen to its destination, it collects lymphatic vessels from the majority of the body. In fact, the only areas of the body not drained by the thoracic duct are the right upper extremity and shoulder, the right lung, the right side of the heart, the convex surface of the liver, and the right half of the face, head, and neck. These structures drain into the right lymphatic duct, which terminates in the right jugulosubclavian junction in the anterior neck.

Lymph vessels are similar to veins, in that they have one-way valves situated every few millimeters along the length of the vessel. These valves prevent the backflow of fluid and promote antero-grad flow. The larger lymph vessels (trunks and major ducts) contain smooth muscle in their walls, which is under sympathetic control. Sympathetic autonomic stimulation results in the constriction of these vessels. It has been suggested that the prolonged stimulation resulting from chronic stress may hinder optimal lymphatic drainage and decongestion of tissues.⁸

The final component of the lymphatic system is the lymph fluid itself. Lymph is the fluid substance that leaks out of the circulatory vasculature and into the lymphatic capillaries by way of the interstitial space. Lymph fluid is usually clear and contains proteins also being transported back to the blood vessels. After a fatty meal, however, the high concentration

of fatty acids cause the lymphatic fluid draining from the gut to the thoracic duct to become thicker and yellow in color. This is called chyle. The main cells found in the lymphatic fluid are lymphocytes. Other substances that may be found in lymph include clotting factors, cellular debris, and bacteria or viruses. The lymph fluid bathes the interstitial space and collects all of these substances for filtration and removal before being emptied back into the vascular system.

Physiology of the lymphatic system:^{3,8}

The lymphatic tissues and fluids have several functions in the human body. The first of these is to maintain the fluid balance of the body. About 30 liters of fluid leaks from the vascular system each day, ninety percent (27 liters) of which is reabsorbed into the venous system at the efferent end of the capillary loop. The remaining three liters of transudate must have another route back to the central venous system if edema is not to ensue. The lymphatic system provides this alternate passage. Through the lymph vessels, the excess fluid is returned to the vascular system.

The second function of the lymphatic system is to filter and purify the interstitial fluid before it is delivered to the main vascular system. As mentioned above, lymph fluid bathes the interstitial space and cleanses the extracellular spaces of cellular debris, exudative material, bacteria, and other pathogens on its way to the lymphatic vessels. Once inside the lymphatic system, these substances pass through the lymph nodes, which filter and cleanse the fluid before it is emptied into the vasculature.

Bodily defense is the third function of the lymphatic system, and is closely tied to the filtration and purification of lymph fluid. As the lymph is cleared of all debris, any antigenic materials are directly delivered to the cells responsible for mounting a defense. Thus the lymphatic system provides a first line of defense against any pathogen that has successfully invaded the body.

As fluid leaves the circulatory system, proteins are also lost into the interstitial space. These proteins have a variety of functions in the human body, from binding chemicals to the transport of nutrients the body needs to function.

For instance, lipoproteins are needed to transport emulsified fats and cholesterol from the GI tract into the blood vessels for processing and utilization. These proteins are synthesized in the liver, exit the vasculature, traverse the interstitial space and are taken up by the lymphatic system where they can perform their function.

Mechanisms of flow:^{3,5,8}

Fluid movement into and out of the vascular system is controlled by various forces both within the capillary and venous systems and the interstitial spaces. These forces are defined as Starling forces and regulate the movement of fluid across a permeable membrane, such as the capillary wall. These forces include: H_c, the capillary hydrostatic pressure, which is determined by the mean pressure in the capillary system; H_i, the interstitial hydrostatic pressure, determined by tissue tension and interstitial fluid volume; π_c, the capillary oncotic pressure, determined by the protein concentration in the serum; and π_i, the interstitial oncotic pressure, determined by the interstitial protein concentration. The relationship of these variables is described as follows:

$$F_f = k[(H_c - H_i) - (\pi_c - \pi_i)]$$

Where F_f is the local rate of fluid movement across the vessel wall (influx vs efflux), k is the capillary wall permeability coefficient, and the other variables are as described above. It can be deduced from the above equation that increases in interstitial fluid can result from an increase in the capillary to interstitial hydrostatic pressure ratio or a decrease in the capillary to interstitial oncotic pressure ratio. Either of these scenarios can result in increased efflux of fluid from the circulation into the intercellular space.

As noted earlier, roughly 30 liters of fluid and protein is lost from the capillaries each day. Most of this fluid (27 liters) is resorbed at the venous end of the capillary bed and directly re-enters the circulation. The remainder of the fluid (3 liters) and proteins must find a way back to the circulation. This is where the lymphatic system finds its utility.

Under normal circumstances, the interstitial fluid pressure is primarily responsible for lymph flow, and is maintained at -6 mmHg. An increase in this

pressure will increase the rate of lymph flow – an increase in pressure to 0 mmHg will increase flow 20 times its normal rate of 120 ml/hour.⁵ However, any increase in interstitial pressure above 0 mmHg causes collapse of the lymphatic capillaries and decreased fluid movement.

Another factor encouraging lymphatic flow is the intrinsic pumping mechanism within the lymph vessels. Because lymph vessels have one-way valves every few millimeters, each section functions as an independent unit. When lymph fluid enters a segment of a lymph vessel, it causes local distention of the vessel. In the larger trunks and vessels, this distention causes constriction of the smooth muscle within the vessel walls and produces pumping of the fluid into the next segment, where the process of distention and constriction is repeated. A similar process occurs in the lymphatic capillaries, which have myoendothelial fibers that provide some contractile function. This intrinsic pumping action also provides a measure of suction, which allows fluid to enter the lymphatic channels in the face of negative interstitial pressure.^{3,8}

Finally, an extrinsic lymphatic pumping mechanism exists to aid lymph movement toward the central circulation. Direct pressure on the lymphatic vessels increases the flow of lymph, and may be exerted by arterial pulsations, muscle contraction, or visceral movement. Even passive activity, such as massage or manipulation increases pressure on the smaller lymphatic vessels. The thoracoabdominal diaphragm is considered to be a very important lymphatic pump. The rise and fall of the diaphragm exerts a rhythmic pumping effect on the cisterna chyli. The movement of the diaphragm also creates a pressure differential between the thoracic and abdominal cavities. The difference in pressure, as well as the movement of the diaphragm, helps pull the lymph fluid toward the venous circulation. Other functional diaphragms aid the thoracoabdominal diaphragm in pulling lymph fluid from the extremities. The efficacy of the extrinsic pumping mechanism can be illustrated by noting that exercise can increase lymph flow 15-20 times the resting flow rate.

Pathophysiology of the Lymphatic system.^{5,6}

Edema results from an imbalance in the amount of fluid lost from the circulation and that taken up by the lymphatic system. Excessive interstitial fluid is associated with increased interstitial pressure, which causes collapse of lymphatic capillaries. This results in cessation of lymph flow from the region, worsening fluid collection and edema.

Conditions of increased venous pressure are associated with increased fluid efflux in the capillary systems and have a propensity to cause edema via an increased in capillary hydrostatic pressure (H_c). These conditions include congestive heart failure, incompetent heart valves, and venous obstruction. Dilatation of the veins and capillaries (such as that caused by kinins and histamines) also result in increased fluid movement into the extracellular space. Low protein states affect fluid movement by decreasing the capillary colloid pressure (π_c).

States in which there is inadequate lymph drainage also result in the development of edema. Trauma or surgical scarring can result in obstruction of regional lymphatic drainage, and the continuation of normal fluid loss from the circulatory system causes an increase in interstitial fluid volume. Other causes of lymphatic obstruction include filariasis and lymphatic metastases. Lack of muscular motion (weakness or paralysis) and restricted thoracic cage motion as seen in COPD, asthma, or acute respiratory illnesses also retards normal lymph flow by loss of the extrinsic lymphatic pump.

The results of edema are widespread. Increased interstitial pressure causes compression of not only the lymphatic channels, but also surrounding tissues, nerves, and vessels, potentially diminishing their function. Impaired vascular and neurologic function results in decreased pH as inter- and intracellular acidosis ensues, further compromising function.

Treatment of Edema:

The goals for treatment of the lymphatic system are to have a well balanced, functioning system, to prevent or reduce edematous fluid in the interstitial space. Because the lymphatic system is a passive system, OMT may be of great benefit with its ability to increase mobility and reduce myofascial restriction. Manipulation is associated with: increased absorp-

tion of fluids, increased circulation and respiration, decreased proteins in the interstitium, and facilitation of a more balanced pH.

Lymphatic treatments are divided into two broad categories. The first are techniques that remove restrictive impediments to lymphatic flow, which may include release of the thoracic inlets, pectoral traction, and release of the pelvic and thoracoabdominal diaphragms. The second are those that promote and augment the flow of lymph fluid; rib raising, local effleurage or massage, and lymphatic pumps. Both types of treatments are used together to effect an increase in lymph to the central circulation. For example, a possible treatment plan for the management of peripheral edema may include:

- Release of the thoracic inlets bilaterally. This reduces restrictions where the lymphatics drain into the circulatory system.
- Rib raising. This reduces any hyper-sympathetonia in the lymphatic vessels and reduces obstruction to fluid flow.
- Release or “doming” of the thoracoabdominal and abdominopelvic diaphragms. This is designed to improve the movement of the major pump of the lymphatic system and permits the generation of adequate abdominothoracic pressure gradients.
- The application of lymphatic pumps. This may include effleurage, massage and thoracic, abdominal, or other lymphatic pumps with the intent to increase the flow of lymph from the interstitial tissues into the lymphatics and back to the central circulation.^{3,8}

Medical treatment of edema may include diuretics, compression wraps, and elevation of the extremities. In the case of recalcitrant edema, compression pumps are used to encourage the proximal movement of fluid.^{2,5} As a last resort, surgical debulking procedures may be attempted, but these are disfiguring procedures and their success is frequently short-lived.^{2,6}

Contraindications

to Lymphatic treatments:

The use of lymphatic treatments in several conditions is considered controversial and generally frowned upon. These conditions include osseous fractures, bacterial infection (with core temperatures above 102°F) and certain stages of cancer. Other contraindications include splenomegaly, active hepatitis, pneumothorax, osteoporosis, pyelonephritis, and recent surgical procedures. Congestive heart failure may be a relative contraindication, as a sudden increase in circulatory volume may exacerbate the condition and cause respiratory distress or pulmonary edema. Anemia and pregnancy are also sometimes included as contraindications, depending on the source.^{3,8}

Conclusions

Given D.W.'s history and physical findings, it seems likely her extremity edema is multifactorial in origin. Since her cerebrovascular accident affected the left side of her body, decreased muscle movement and weakness has most likely decreased lymphatic drainage of her left lower extremity. The recent history of trauma and multiple fractures, along with the soft tissue injury concurrent with that injury and reparative surgery makes localized damage to blood and lymphatic structures another likely cause for her edema. The exact role each of these mechanisms, and others, play in the etiology of her symptoms are probably impossible to determine.

As outlined above, the general treatment plan for edema first includes release of the central fascial structures in the thoracic inlet and diaphragms followed by rib raising and some sort of lymphatic pump to encourage fluid movement. For D.W., we followed this general treatment plan and released the thoracic inlets (Sibson's fascia) bilaterally and released the thoracoabdominal and pelvic diaphragms. Rib raising was performed to the patient's tolerance and finally a popliteal fossa release on the left was followed by effleurage and range of motion of the affected area. A thoracic pump was performed at the last to encourage lymph flow to the central vascular compartment.

The results of the treatment were seen

almost immediately. After the effleurage of the left lower extremity was performed, the extremity was noticeably smaller in diameter and D.W. remarked that she had a significantly lower pain level than before the treatment. Unfortunately, the extremity was not measured prior to the treatment to provide objective evidence of the efficacy of the treatment.

D.W. was released to home and asked to return in 2 weeks for a repeat treatment. Upon her return, she noted less pain and swelling than at the previous visit. It appeared that much of the volume had returned to her lower extremity, however. The treatment was repeated as above, with similar results, and D.W. was asked to return in another week, and then periodically for maintenance treatments.

Summary

Edema may follow any traumatic event. The specific mechanism of the edema is unclear, but may include damage to vessels, nerves, and lymphatics in the surrounding area which alter the balance of fluid entering and leaving the interstitial space. While the exact etiology of traumatically-induced edema has not currently been explained, it seems clear, at least in the case of D.W., that OMT is an effective treatment – providing both relief from edema and the pain and immobility associated with the original injury.

The lack of current, objective clinical studies on the use of OMT in the treatment of edema is striking. Most literature involving the treatment of edema is anecdotal or based on pharmacologic or surgical treatment of a condition that would seem to respond very well to gentle manipulation. More studies are definitely needed to determine the exact role of OMT in the management of this condition.

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ERRATA SLIP

June 2005, Vol. 15, No. 2, pg. 25
Be careful with this kind of case!
Richard C. MacDonald

First Column, 16 lines from bottom should read: Horners Syndrome

Correct address for Dr. MacDonald:
Richard C. MacDonald, DO
649 Highway One, Suite 12A
North Palm Beach, FL 33408

Our sincere apologies to Dr. MacDonald for these errors.

Diagnosis of Muscle Imbalance and Exercise Prescription

(The Greeman Protocol)

January 20-22, 2006

LECOM

Bradenton, FL

Course Description: Level II

How to access muscle balance of the musculoskeletal system, particularly in reference to somatic dysfunction. The primary goal is to prescribe an exercise program and self-mobilization techniques to fit the patient's somatic dysfunction in order for the patient to manage themselves.

Learning Objectives:

1. To understand the functional anatomical connections of upper and lower quarter musculature to the proximal trunk and pelvis.
2. To introduce the concept of neuromuscular imbalance as a contribution to chronic musculoskeletal dysfunction.
3. To learn exercises to address specific somatic dysfunctions found in the vertebral column and pelvis.
4. To be able to design and sequence a home exercise program for patients to complement manual medicine.
5. To be able to instruct the patient in an exercise program based upon his/her functional goals and life-style.

Prerequisites

Functional Anatomy; One Level 1 course or equivalent

The program anticipates being approved for 20 hours of AOA Category 1-A CME credit pending approval by the AOA CCME.

Program Time Table:

Friday, January 20 8:00 am - 5:30 pm
Saturday, January 21 8:00 am - 5:30 pm
Sunday, January 22 8:00 am - 12:30 pm
(Friday & Saturday include (2) 15 minute breaks and a (1) hour lunch; Sunday includes a 30 minute break)

Course Location:

Lake Erie College of Osteopathic Medicine/FL
5000 Lakewood Ranch Blvd.
Bradenton, FL 34211
www.lecom.edu/bradenton

Hotel Accommodations:

Hotels/Motels near course site: Days Inn (941) 746-2505;
Holiday Inn Riverfront (941) 747-3727
For other hotel possibilities, visit:
www.expedia.com; www.travelocity.com;
www.priceline.com; or www.BizRate.com

Registration Form Greenman's Exercise Prescription January 20-22, 2006

Full Name _____

Nickname for Badge _____

Street Address _____

City _____ State _____ Zip _____

Office phone # _____

Fax #: _____

E-mail: _____

By releasing your Fax number/E-mail address, you have given the AAO permission to send marketing information regarding courses via the Fax/E-mail.

AOA # _____ College/Yr Graduated _____

I need AAFP credit

I require a vegetarian meal

(AAO makes every attempt to provide snacks/meals that will meet participant's needs. But, we cannot guarantee to satisfy all requests.)

Registration Rates

	On or Before 12/20/05	After 12/20/05
AAO Member	\$550	\$650
Intern/Resident/Student	\$450	\$550
AAO Non-Member	\$765	\$865

(Non-members – see membership application on page 23)

AAO accepts Visa or Mastercard

Credit Card # _____

Cardholder's Name _____

Date of Expiration _____

Signature _____



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Book Review

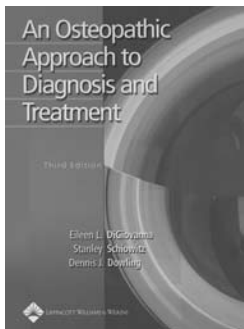
Reviewer: Anthony G. Chila



Gevitz, Norman: *THE DOs: OSTEOPATHIC MEDICINE IN AMERICA*. Second Edition, 2004. Johns Hopkins University Press; Baltimore, MD pp. 242 including Index. ISBN 0-8018-7834-9. \$24.95

Originally prepared as the author's doctoral dissertation, publication by Johns Hopkins University Press in 1982 received comment as "By far the most definitive examination of the evolution of an alternative system of healing....". 22 years later, the second edition of 2004 retains the headings of the original nine chapters, but addresses the recent two decades' impact on the osteopathic profession in chapters ten and eleven. Chapter 10, *In A Sea Of Change* addresses: COSTS AND CONTROLS, PARITY AND INCLUSION, THE ENDANGERED OSTEOPATHIC HOSPITAL, INTERNSHIP AND RESIDENCY SHORTAGES. Chapter 11, *The Challenge Of Distinctiveness*, addresses: OSTEOPATHIC COLLEGES, DO-MD RELATIONS, OSTEOPATHIC PRINCIPLES AND PRACTICES, OSTEOPATHIC CLINICAL RESEARCH, VISIBILITY AND RECOGNITION, THE FUTURE. It is in these ten topics that the author demonstrates his commanding knowledge of the osteopathic profession's behaviors and tendencies. For the reader familiar with the first edition, these chapters alone are demanding of critical study in order to gauge the potential for future development of and contribution by the osteopathic profession. Citing the final paragraph of the second edition illustrates this very well:

"Realistically, given its current medical and social position, it would likely be a lengthy, difficult, and expensive process to achieve this most desirable status. It would require a large number of committed practitioners and supportive laypersons and significant public and private resources to underwrite and support excellence in osteopathic education, research, and clinical services. Nevertheless, some in this profession have already taken a necessary first step. They have dedicated themselves to furthering core osteopathic beliefs and practices and they are emphasizing to patients and others their distinctiveness from rather than their similarities to other physicians. But many other DOs, particularly younger practitioners, would need to follow that lead and choose to practice distinctively, to engage in research on the fundamental precepts upon which their profession rests, and to fight for their continued autonomy and independence. What course they will pursue is by no means clear. Literally as well as figuratively, the future of osteopathic medicine may ultimately rest in the DOs' own hands—and how they use them."



DiGiovanna, EL; Schiowitz, S; Dowling, DJ: *An Osteopathic Approach to Diagnosis and Treatment*. Third Edition, 2005. Lippincott Williams and Wilkins; Philadelphia, PA pp. 707 including Index. ISBN 0-7817-4293-5. \$79.95

This text, authored by Doctors DiGiovanna and Schiowitz, first appeared in 1991, approximating the centenary of osteopathic medical education. It appeared at a time when relatively few contemporary texts on osteopathy were available. The authors sought to prepare a comprehensive volume of concepts and techniques useful as a reference for osteopathic medical students and practicing physicians. The same goal was held for the second edition in 1997. This third edition adds a new author, Dennis J. Dowling, DO, FAAO. Revisions have been made which seek to continue meeting the goal of the first two editions. Coverage of newly developed technique approaches is expanded, as well as the inclusion of practical applications. In the various body region sections, case histories are included which illustrate the applicability of osteopathic manipulative methods. The volume is illustrated by Doctor Dowling. This volume enjoyed an immediate popularity among students and teachers in colleges of osteopathic medicine in 1991, and has continued to do so through intervening editions. It is an example of the studied organization of teaching material developed by faculty (Schiowitz). This initial phase of the volume's history set the stage for elaboration to the academic arena (DiGiovanna). Commitment to teaching excellence saw the inclusion of many of the NYCOM/NYIT Predoctoral Fellows in OMM as authors, thus reinforcing goals for future practitioners. The addition of Doctor Dowling as an author in this new edition begins to address the legacy aspect of publication.

Elsewhere in Print

TOOTH CONTACT IN PATIENTS WITH TEMPOROMANDIBULAR DISORDERS

CRANIO: The Journal of Craniomandibular Practice; July 2005, Volume 23, Number 3, 188

Alan G. Glaros, PhD; Karen Williams, PhD, Leonard Lausten, DDS, Lynn R. Friesen, DDS, MS

ABSTRACT: Both experimental and retrospective studies suggest a link between parafunctions and pain in temporomandibular disorder (TMD) patients. To investigate the role of parafunctions in TMD, experience sampling methodology was used as a prospective test of the hypothesis that patients with TMD have higher levels of tooth contact and tension than non-TMD controls. Three groups of TMD patients and a group of normal controls carried pagers for one week, were contacted approximately every two hours by an automated calling system, and completed questionnaires assessing tooth contact, tension, and pain at each contact. Results showed that tooth contact was much more frequent among normal controls than is commonly presumed. Patients with myofascial pain with/without arthralgia reported more frequent contact, higher intensity contact, and more tension than patients with disk displacement or normal controls. Increased masticatory muscle activity responsible for tooth contact and tension may be an important mechanism in the etiology and maintenance of the myofascial pain and arthralgia of TMD.

DOES HEAD POSTURE HAVE A SIGNIFICANT EFFECT ON THE HYOID BONE POSITION AND STERNOCLEIDOMASTOID ELECTROMYOGRAPHIC ACTIVITY IN YOUNG ADULTS?

CRANIO: The Journal of Craniomandibular Practice; July 2005, Volume 23, Number 3, 204

ABSTRACT: The aim of this study was to evaluate the associations between head posture (head extension, normal head posture, and head flexion) and anteroposterior head position, hyoid bone position, and the sternocleidomastoid integrated electromyographic (IEMG) activity in a sample of young adults. The study included 50 individuals with natural dentition and bilateral molar support. A lateral craniocervical radiograph was taken for each subject and a cephalometric analysis was performed. Head posture was measured by means of the craniovertebral angle formed by the MacGregor plane and the odontoid plane. According to the value of this angle, the sample was divided into the following three groups: head extension (less than 95°); normal head posture (between 95° and 106°); and head flexion (more than 106°). The following cephalometric measurements were taken to compare the three groups: anteroposterior head position (true vertical plane/pterygoid distance), anteroposterior hyoid bone position (true vertical plane-Ha distance), vertical hyoid bone position (H-H' distance in the hyoid triangle), and C0-C2 distance. In the three groups, IEMG recordings at rest and during swallowing of saliva and maximal voluntary clenching were performed by placing bipolar surface electrodes on the right and left sternocleidomastoid muscles. In addition, the condition with/without craniomandibular dysfunction (CMD) in each group was also assessed. Head posture showed no significant association with anteroposterior head position, anteroposterior hyoid bone position, vertical hyoid bone position, or sternocleidomastoid IEMG activity. There was no association to head posture with/without the condition of CMD. Clinical relevance of the results is discussed.

RESEARCH DIAGNOSTIC CRITERIA FOR TEMPOROMANDIBULAR DISORDERS: A CALIBRATION AND RELIABILITY STUDY

CRANIO: The Journal of Craniomandibular Practice; July 2005, Volume 23, Number 3, 212

ABSTRACT: The aim of this study was to investigate the reliability between different examiners when using the axis I of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). The hypothesis was that the standardized RDC/TMD examination protocol enables calibrated examiners to evaluate all examination items reliably. After calibration training by the RDCITMD calibration team including the calibration of palpation pressure and the performance of the standardized examination protocol, four examiners, blinded to the patients' medical histories examined 24 subjects in a randomized sequence. One experienced examiner was the standard (hierarchical calibration). The recorded measurements strictly followed the RDC/TMD. Intraclass correlation coefficients (ICC), bias and precision were calculated to estimate interrater reliability. Acceptable ($0.75 < ICC < 0.9$) to excellent ($ICC > 0.75$) reliability was found for 20 of the 23 (87%) examinations. Only sub-retromandibular muscle palpation and joint sound vibration recordings on lateral excursion showed poor-results ($ICC < 0.4$). The RDCITMD examination protocol enables calibrated examiners to perform most (87%) examination items with satisfactory reliability. Therefore multi-site studies based on the RDCITMD examination protocol may become feasible, keeping in mind the unsatisfactory reliability of 13% of the items (clicking during laterotrusion to the ipsilateral side, palpation of the posterior and submandibular region).



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