

THE AAO

FORUM FOR OSTEOPATHIC THOUGHT

# JOURNAL

 Official Publication of the American Academy of Osteopathy®

TRADITION SHAPES THE FUTURE

VOLUME 15 NUMBER 2 JUNE 2005

**C1 Somatic Dysfunction**

see page 11

# 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.

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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.

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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**

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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.

### **Computer Disks**

We encourage and welcome computer disks containing the material submitted in hard copy form. Though we prefer Macintosh 3-1/2" disks, MS-DOS formats using either 3-1/2" or 5-1/4" discs are equally acceptable.

### **Abstract**

Provide a 150-word abstract that summarizes the main points of the paper and its conclusions.

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1. References are required for all material derived from the work of others. Cite all references in numerical order in the text. If there are references used as general source material, but from which no specific information was taken, list them in alphabetical order following the numbered journals.
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**TRADITION SHAPES THE FUTURE • VOLUME 15 NUMBER 2 JUNE 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

## JUNE

17-19 *Visceral Approach  
to Cardiopulmonary Dysfunction*  
UNECOM; Biddeford, ME

## JULY

29-31 *Muscle Energy: Three Visions*  
Midwestern University/CCOM; Chicago, IL

## AUGUST

19-22 *15th Annual OMT Update: Application of  
Osteopathic Concepts in Clinical Medicine  
plus Preparation for Certifying Boards*  
The Contemporary at Walt Disney World®  
Buena Vista, FL

## SEPTEMBER

16-18 *Clinical Application of Principles of  
Ligamentous Articular Strain in Primary Care*  
UMDNJ-SOM; Stratford, NJ

## 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

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April 29-May 1, 2005; Philadelphia, PA  
June 24-26, 2005; Chicago, IL

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### Continuing Education:

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(June course co-sponsorship by the AAO is pending)  
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### Course Leader:

Melicien A. Tettambel, DO, FACOOG, FAAO

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# View from the Pyramids

Anthony G. Chila

## Forty Years

On May 28, 1965, 103 new graduates of the *Kansas City College of Osteopathy and Surgery* received the degree *Doctor of Osteopathy* from that institution. At the time, the osteopathic profession was not far removed from the damaging effect of the MD-DO merger in the state of California (1962). Five colleges of Osteopathy were in existence, all of them free-standing institutions. The ability of the osteopathic profession to sustain itself was undergoing serious question. The institution (*KCCOS*) celebrated its 50th Anniversary in 1966, one year later.

The graduates of 1965 uniformly entered a one-year period of Postdoctoral training described as a Rotating Internship. Following that year, entry into General Practice or Residency Training in various specialty programs provided the next step in career development. With relatively few exceptions, these training programs were conducted in osteopathic institutions under the purview of the American Osteopathic Association. Subsequent years would show active and visible professional profiles for many of the class members.

The *KCCOS* Class of 1965 began celebrating reunions commencing with its 10<sup>th</sup> Anniversary in 1975. As is true of all institutional classes, reunions have provided the opportunity to re-establish acquaintance, learn of interval occurrences, and become aware of change at Alma Mater. In any class, retirement has removed members from the active role of osteopathic practice and death has diminished the number of survivors attending each subsequent reunion.

June, 2005. Forty years later, the institution has undergone various name changes: *Kansas City College of Osteopathic Medicine; The University of Health Sciences College of Osteopathic Medicine; Kansas City University of Medicine and Biosciences*. The social history of osteopathic medicine has shown remarkable change in numbers of institutions; affiliation with universities; funding support; expanded training and practice opportunities. Various name changes have occurred for osteopathic institutions during this period of time. It cannot be said that osteopathic institutions for continuing postdoctoral training are in existence, as they were in 1965. Perhaps this is a price to be paid for satisfying society's expectation of adequate demonstration of philosophical distinction and differentiation of practice.

The *KCCOS* Class of 1965 is scheduled to hold its 40<sup>th</sup> Anniversary Banquet on September 8, 2005 at Kansas City, MO. In preparing to do so, it would be well for those who

attend to recall the words of then-President Eugene P. Powers, given in August 1966<sup>1</sup>:

"Each of us, in one way or another, is a debtor. We are, not in myth but in fact, debtors to a long line of ancestors who have given us religion, family, and civilization. In a very specific way, every graduate of any college or university is a debtor to that institution.

Reflect for one moment on your personal life as it exists now and as it was prior to attendance at and graduation from the *Kansas City College of Osteopathy and Surgery*. Is your financial picture better? Is your status position in community life better? Is your psychic income greater because you serve humanity as an Osteopathic Physician? These and many other questions could be asked and in the main your answer would, in all honesty, have to be an unqualified and emphatic "yes". If, however, only one of these many questions could be answered in the affirmative, you would qualify as a "debtor" to your Alma Mater, *KCCOS*.

The honor of debtorship comes in the willing and prompt payment in full measure of those obligations which were willingly accepted by the debtor. It is a personal and a private liability which must be resolved by each individual in the honor of his ethical self. One cannot in justice excuse his debt by blaming the past or rationalizing his own weakness into the failures of others. It simply is true that you and you alone are the measure of your indebtedness and of the progress you have made toward reparation of this deficit.

The *Kansas City College of Osteopathy and Surgery* is as intimately you as if it were, in fact, your natural mother. Your education is as good as the education offered within her classrooms. Her medicine is your medicine. Her image is your image. Destroy her image; hurt her progress; and you simply hurt and destroy yourself.

We candidly ask you to appraise your indebtedness to your Alma Mater and attempt to give her that fair share of financial and moral support which is just and reasonable. Preach the word to all that *KCCOS* is on the march toward excellence and that each member of the Alumni should very naturally want to bear a little more than his fair share of the burdens required for this progress. More important, however, is the bold fact that we want each and every member of our Alumni to say with pride, *KCCOS* is my college, *KCCOS* is my Alma Mater."

1. The HEARTBEAT: 50 Year Anniversary Issue; *Kansas City College of Osteopathy and Surgery*; August 1966

# Contributors

**David Coffey. C1 Somatic Dysfunction And Unilateral Retroorbital Cephalgia.** As recently as one year ago (2004), literature search revealed 3311 articles related to cervicogenic cephalgia. The author has addressed this in terms of attempting to provide anatomic and physiologic support for somatic dysfunction relevant to this problem. Specifically considered is the observation of a painful and prominent transverse process of C1 associated with unilateral retroorbital headache. In pursuing this original contribution to osteopathic literature, the author seeks to facilitate the elaboration of diagnostic considerations in the *International Classification of Headache*. Practicing clinicians are encouraged to use this finding to help avoid misdiagnosis of ocular migraine or cluster headache. Submitted in partial fulfillment of requirements for Fellowship in the American Academy of Osteopathy. Doctor Coffey was conferred status as Fellow in 2004. (p. 11)

**Richard C. MacDonald. Be Careful With This Kind Of Case!** The author presents a forthright discussion of an encounter with a complicated clinical presentation. The osteopathic assessment and utilization of manipulative intervention are particularly relevant, given recent discussions of cervical spine dysfunction. This is a highly instructive contribution. Doctor MacDonald is a Past President of the American Academy of Osteopathy (1978-1979). (p. 25)

**American Academy Of Osteopathy® Consensus Statement For Osteopathic Manipulation Of Somatic Dysfunction Under Anesthesia And Conscious Sedation.** Osteopathic physicians have made use of manipulation of somatic dysfunction under anesthesia for many years. Research studies and publications regarding this approach have been limited. This document represents a consensus statement, revised by the American Academy of Osteopathy Board of Governors, March 16, 2005. (p. 26)

**R. Paul Lee. Review Of The Intelligent Body.** The author shares his observations of the program of the *Sutherland Cranial College* (London, England; April 16-17, 2005). Speakers Stephen Levin, MD (Tensegrity) and James Oschman, PhD (The Living Matrix) provided challenge for integration of these ideas through palpatory exercises. Doctor Lee's description of the seminar's process of multilevel viewing of the body (mechanically, spatially, energetically and spiritually) is exciting. (p. 29)

**Laura McMurrey and Stuart F. Williams. Abreactions In Ligamentous Articular Strain.** The authors offer a thoughtful assessment of a clinical presentation associated with abreaction ("the expression and emotional discharge of unconscious material [as a repressed idea or emotion]"). Of particular value to practitioners is their interpretation of abreactions occurring in association with various forms of

# Regular Features

manipulation. This consideration bears further observation and documentation. (p. 21)

**DIG ON.** The process of osteopathic education often appears to contemporary students as a dichotomy: "This is medicine; That is OMM". Observations about this seemingly continuing struggle for synthesis move past today's environment to review a similar situation which occurred in 1969. (p. 8)

**FROM THE ARCHIVES.** Periodic reminder that *Principles of Treatment* must underlie the development of a rational plan for treatment is provided in this selection. *Diseases Of The Head And Neck* (J. Deason, MS, DO; Journal Printing Company; Kirksville, Missouri, 1921) is such a reminder. The text is a representation of an early 20<sup>th</sup> Century osteopathic physician's clinical and laboratory research. (p. 9)

**BOOK REVIEW.** In this issue comments are offered about the recent publication (2003 and 2004) of collected papers of **Paul E Kimberly** and **David Heilig**. Both of these prominent educators were strongly affiliated with the mission of the *American Academy of Osteopathy*®. Distinctive professional effort characterized each. Both were articulate exponents of osteopathic philosophy, principles and practice. The 20<sup>th</sup> Anniversary of the **Osteopathic Center for Children** was the occasion for an International Research Conference (2002), Proceedings of which are reviewed. (p. 33)

**ELSEWHERE IN PRINT.** *Rheumatoid Arthritis and Monosodium Urate Deposition Arthropathy* are two clinical conditions encountered by osteopathic physicians. Abstracts provided from two publications (Consultant and Advanced Studies in Medicine) offer contemporary views of diagnosis and management. The content of these abstracts suggests opportunity for thoughtful application of osteopathic philosophy in management. (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)

## Sage Sayings of Still

### Headaches

"In all continued or periodic headaches I have found the shutoff in the bones of the neck at their union with the head and in the other joints as far down as the fourth dorsal and even as far as the lumbar, sacrum and coccyx. I have found abnormal positions of both bone and muscle resulting in the production of such effects."

*Research and Practice, p. 358*

# Component Societies' CME Calendar and other Osteopathic Affiliated Organizations

## June 9-11, 2005

*Getting a Grip on Low Back Pain*  
American Academy  
of Musculoskeletal Medicine  
Thomas H. Ravin, MD  
Denver, CO  
CME: 18 Category 1A (anticipated)  
Contact: AAOM  
202/270-9191

## June 9-13, 2005

*SCTF 40-hour Basic Course*  
*Osteopathy in the Cranial Field*  
NYCOM  
Westbury, NY  
Director: Hugh Ettlinger, DO, FAAO  
Contact: Judy Staser  
817/926-7705

## June 18-22, 2005

*June Basic Course*  
The Cranial Academy  
Indian Lakes Resort  
Bloomington, IL  
CME: 40 Category 1A (anticipated)  
Contact: The Cranial Academy  
317/594-0411

## June 23-25, 2005

*3rd Annual Meeting*  
American Association of Colleges of  
Osteopathic Medicine (AACOM)  
Bethesda, MD  
Further details will be published on the  
Website as it becomes available: [http://  
www.aacom.org.events/annualmtg](http://www.aacom.org.events/annualmtg)

## June 23-26, 2005

*Annual Conference:*  
*The Osteopathic Mind*  
The Cranial Academy  
Indian Lakes Resort  
Bloomington, IL  
Contact: The Cranial Academy  
317/594-0411

## June 23-26, 2005

*107th Annual Osteopathic Medical  
Convention & Scientific Seminar*  
Tennessee Osteopathic Medical Assn.  
Chattanooga, TN  
Contact: Sara Linton  
slinton@walkermgt.com  
Further details, visit: [http://www.  
tomanet.org](http://www.tomanet.org)

## September 2-5, 2005

*Biodynamics Phase III:*  
*The Long Tide and the Dura*  
Topanga, CA  
CME: 22.5 Category 1A (anticipated)  
Contact: Stefan Hagopian, DO  
207/778-9847

## September 3-6, 2005

*Biodynamics Phase II*  
Kona, HI  
CME: 23 Category 1A (anticipated)  
Contact: Thomas Shaver, DO  
207/778-9847

## September 10-11, 2005

*Using the Powers*  
*within the Patient's Body*  
A Still Sutherland Study Group  
UNECOM  
Biddeford, ME  
CME: 14 Category 1A  
Contact: Andrew Goldman, DO  
860/364-5990

## September 11-14, 2005

*Biodynamics Phase II: The Fluid Body*  
Franconia, NH  
CME: 23 Category 1A (anticipated)  
Contact: James Jealous, DO  
207/778-9847

## September 22-24, 2005

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

## October 6-9, 2005

*SCTF Continuing Studies Course*  
*Teaching the Teachers*  
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](http://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](http://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

# Dig On

Anthony G. Chila



## The More Things Change...

The teaching of manipulative modalities in the osteopathic medical curriculum has undergone significant change during the past forty years. Gradual movement away from a single mode approach to teaching has been accompanied by the appearance of numerous modes. In the teaching and learning of these modes, emphasis is often placed on one or another aspect of neurobiologic effect which seems appropriate to a given mode. All too often, adequate research-related support for explanation is lacking. As a result, the osteopathic physician-to-be appears to leave the academic arena without the ability to effectively synthesize the information presented. It would seem that the proximity of in-depth Basic Sciences and Clinical Sciences teaching in the several colleges of osteopathic medicine should at least facilitate evidence-based understanding of the neurobiologic mechanisms of manipulation. But is this really so? More often, it appears that the contemporary student body in osteopathic medical colleges functions under the dichotomy of “this is medicine and that is OMM”. Why is a (the) common denominator missing?

*Foundations for Osteopathic Medicine* (Second Edition, 2003) devotes three sections to osteopathic manipulative methods:

- |   |                |
|---|----------------|
| A. Overview: Evaluation and Management            | Chapters 30-44 |
| B. Regional Examination and Treatment             | Chapters 45-53 |
| C. Palpatory Diagnosis and Manipulative Treatment | Chapters 54-73 |

In Part C, approximately 17 technical approaches are presented by various authors. The descriptors seem to represent consideration of practically all body components capable of being involved in a manipulative encounter. Additional discussion of application of treatment in the hospital setting and issues of efficacy and complication complete this part of the text. Finding a common denominator for all of these presentations is not necessarily easy to accomplish.

The emphasis on Palpatory Diagnosis and Manipulative Treatment described in the preceding paragraph was anticipated in a Workshop presented at the *Spring Study Session, New England Academy of Applied Osteopathy* (May 2-3, 1969; Lexington, Massachusetts). The Program Chairman was Foster Dryden Clark, DO. Panel members were William L. Johnston, DO, FAAO; J. Allan Robertson, Jr., BS, DO; Edward G. Stiles,

BS, DO. The topic of the workshop was *Finding A Common Denominator For The Variety Of Manipulative Techniques*.<sup>1</sup> The panel participants were representative of Postdoctoral Intern Training (Robertson); Recent years of practice (Stiles); Experienced Clinician (Johnston). Doctor Johnston provided the summary of the workshop, and it is worth citing in its entirety:

“In summary then, what we’ve been sampling in this workshop session is the use, first of all, of a particular kind of light palpation that rides or monitors a somatic area as it moves. Our first project was using the motion of inspiration, and your objective was to locate an area that resisted or expressed restriction to this motion. Our second project was an extension in use of this same kind of palpation, for the purpose this time of fact-finding throughout the entire thoracic cage, anterior and posterior, to pick out areas binding up restrictively during inspiration, and to qualify their size as to small (segmental), or large (larger than segmental).

At this point we challenged you to examine each your own current use of clues from lesioned areas and especially your application of these in treating large and small areas of somatic distortion, mostly so that you could knowingly appreciate your own framework for receiving a new kind of motion clue.

This was examined in our third project, exploring the nature of movement into the anterior compartment, operator-induced. This fingertip clue, from an area which resisted going into the anterior compartment, was then interpreted in relation to the changing position of hips-to-shoulders that became evident in the testing. Our common denominator, of course, is this close, actually inseparable, relationship between body motion and changing position. In this workshop, we’ve developed but one aspect of this common denominator to show its relevance to the successful use of a specific manipulative approach.”

The more things change... the more they remain the same.

1. *Finding A Common Denominator For The Variety Of Manipulative Techniques*: Academy of Applied Osteopathy; 1969 Year Book Of Selected Osteopathic Papers, 5-15.



## Diseases of the Head and Neck

J. Deason; Journal Printing Company, Kirksville MO, 1921, pgs. 41-43

### Foreword

This book is not intended to be complete in any sense, but only a monographic review of the author's clinical and laboratory researches. It is written for the use of students and general practitioners and is intended to present the Osteopathic Concept as applied to cause and treatment of diseases of the head and neck, with special reference to certain diseases in which the profession has made unusual progress. Descriptions of surgical technic have been omitted, because they can be found in various other books.

The book is supposed to be a revision of Bulletin No. 3 of the A. T. Still Research Institute written by the author and published in 1915, but it was found that a complete rewriting was necessary.

With permission from the editor of the *American Osteopathic Association Journal*, some of the author's material from various papers has been included. Also, with permission from the authors, a part of the material from McConnell and Teall's *Practice of Osteopathy* has been used.

The reader is expected to make frequent reference to his texts on anatomy for pictures and cuts illustrating the various anatomical structures.

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### CHAPTER THREE

#### Principles of Treatment

Rationalism in treatment requires logical theory of cause. Empiricism in treatment, while it frequently accomplishes results, cannot be the choice of the conscientious, scientific physician, because he wants his results to be constant and permanent. Such results can be obtained only by following some definite, rational plan.

**Acute Disease.** It may be stated as an osteopathic theorem that body fluids contain the necessary chemic and biologic properties to combat ordinary infection and, as a corollary, it may be added that certain body structures have the power to produce specific, biologic substances for protection against specific and virulent forms of infection.

Rational treatment, therefore, consists of those methods by means of which arterial blood of good quality and quantity is supplied to the parts involved. To accomplish this: First, all structural lesions that may interfere with nerve control and direct arterial function must be removed. (the author referred the reader to Dr. Still's method):

*“Adjust whatever slight irregularity you find in the cervical and upper dorsal regions. Bring your clavicles well up and forward. Look carefully to your upper four ribs and see that they are perfectly adjusted on both sternum and spine. Free the hyoid bone from any contracted muscle which could bind it. Treat your patient once or twice daily in severe cases, and, when the case is a very obstinate one, stick to it until you obtain good circulation. Then go to the lumbar region and treat there to open the excretories. See that the lumbar vertebrae are in line and that the floating ribs are well up and in their proper places. Do all your work in the neck region from the outside.”*

Second, the patient must be kept at rest to conserve vital force for combating the disease and for repair. Third, the efficiency of local blood supply may be enhanced by aspiration or cupping of the part, by Bier's hyperemic method, by hot irrigation and by intermittent application of heat.

Dr. Still's rule of the artery applies equally to the venous and lymphatic drainage, and this is just as important because the “sour” blood, the result of toxic absorption, must be removed. To

accomplish this, Dr. Still advises adjustment of the upper ribs, clavicles and hyoid, and deep muscle relaxation.

Since toxic absorption means systemic poisoning, elimination is to be accomplished by lower dorsal and lumbar treatment to maintain kidney and intestinal efficiency, while other methods, such as colonic irrigation, sweating, etc., are to be employed.

**Surgery in Acute Disease** is indicated only in cases of abscess cavities, pyoceles, etc., which are not readily drained by other methods. In general, such abscesses, when not drained otherwise, should receive surgical attention in from 12 to 48 hours if the best results are to be obtained and normal function restored. Except, in these cases of occluded pus, direct treatment is contraindicated in acute disease. After-treatment, for the purpose of restoring normal blood supply and nerve control and for the reduction of pathologic change to normally functional structure, is essential and should be continued until the desired ends have been accomplished.

Similar osteopathic treatment is just as essential following surgery, and here



is where the osteopathic concept of surgery differs materially from the medical concept of surgery. Osteopathically, surgery is only a means to an end, and is never, in itself, a complete treatment.

**Chronic Disease.** In the consideration of chronic disease it is necessary to understand that there has been an acute stage, the results of which have not received efficient after-treatment, or there has been a slowly progressive impairment of function of long duration.

Pathologically, the first stages of perverted function, hyperemia, etc., have progressed into the secondary and more developed stages of hypertrophy, hyperplasia and marked deficiency of function and normal resistance.

Theoretically, those anatomic perversions which have resulted in physiologic and pathologic perversions will, when corrected, tend to permit restoration of normal function through normal physiologic forces. It is interesting to note that clinical research proves quite conclusively the efficiency of this theorem in practice.

The third stage or pathologic change, that which has resulted in definite structural change of tissue, can not be wholly overcome because physiologic forces can only normalize. They cannot replace structure except to a limited degree, but these forces can normalize the function of the unchanged tissue and they can prevent further pathologic change.

Principles of treatment in chronic disease are, therefore, similar to those stated in acute disease. Treatment intended to normalize structural perversions, and thus normalize physiologic forces, is efficient, but the time of treatment necessary to cause restoration varies directly as the time of causation, because natural forces work slowly in cause as well as in cure.

**Surgery in Chronic Disease.** In chronic disease, surgery is limited to

1. The removal of structural perversions which directly interfere with normal function and which cannot be reduced by simpler methods.

2. Drainage of pus cavities which directly or indirectly cause abnormal function or pathologic change.

3. The removal of any structure, not vitally essential, which endangers normalization and which structure itself cannot be normalized. Again it is essential to understand that surgery in itself is not to be considered the finality of treatment, but only a part of the necessary normalizing treatment.  $\Delta$

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# C1 Somatic Dysfunction and Unilateral Retroorbital Cephalalgia

David Coffey

*The purpose of this paper is to establish somatic dysfunction at C1, which involves the entire occipitoatlantoaxial joint complex, as a cause of unilateral retroorbital cephalalgia and to describe an osteopathic treatment when there is a laterally prominent transverse process of C1 on the same side as the cephalalgia.*

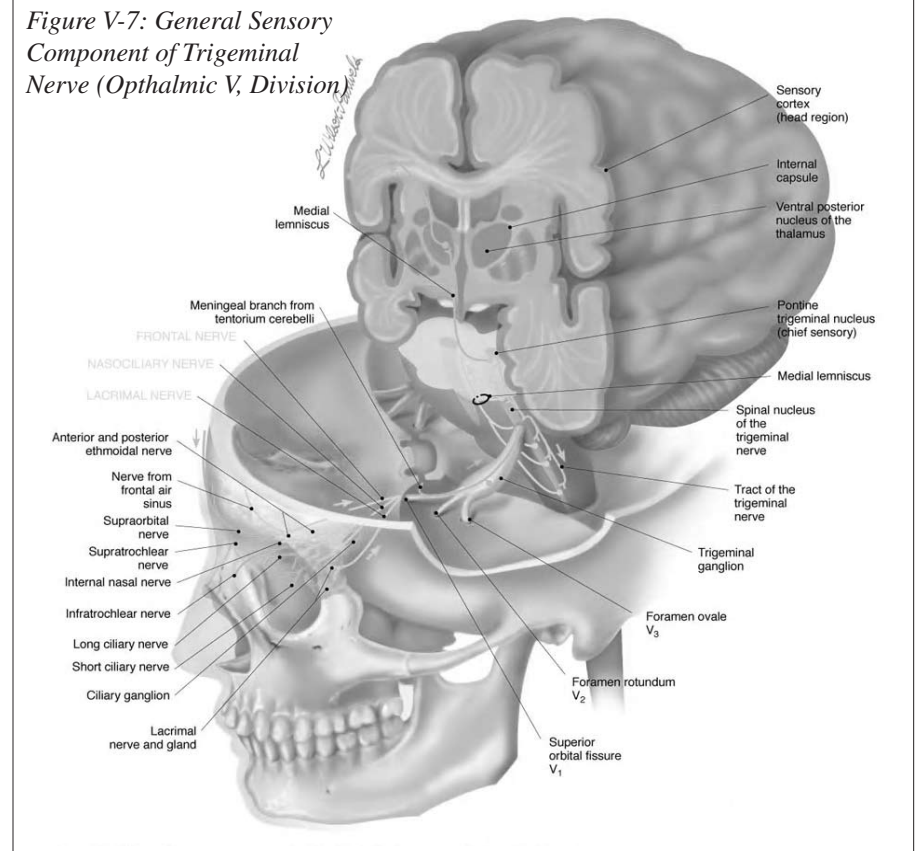
Cervicogenic headaches originate in the neck, are unilateral in character, and do not move from side to side.<sup>1</sup> Major symptoms include pain and reduced range of motion, which may be induced by mechanical pressure or awkward head positioning, in the ipsilateral upper posterior region of the cervical spine. The pain is always on one side, starts in the posterior portion of the head or neck and moves to the ipsilateral eye and fronto-temporal area. Duration of attacks vary and are moderate to severe in intensity.<sup>2</sup> The Headache Classification Committee of the "International Headache Society" in 1988 concluded that the concept of cervicogenic headache was not sufficiently validated due to a lack of substantial numbers of patients using diagnostic tests or valid diagnostic criteria.<sup>3</sup> I would like to provide an observation from clinical practice, which supports the diagnostic criteria of cervicogenic headache. I would also like to explore the phenomenon of a painful, laterally prominent, palpable transverse process of C1 and its relationship to an unrelenting, continuous, ipsilateral retroorbital headache.

Orbital and retroorbital pain is mediated by the trigeminal system. Afferent axons descend in the spinal trigeminal tract and terminate in the pars caudalis of the spinal trigeminal nucleus. The pars caudalis is that part of the spinal trigeminal nucleus found in the caudal medulla and the upper three segments of the cervical cord. It relays with the

trigeminothalamic tract, which is continuous with the anterolateral system, and is the site of termination for nociceptors and thermoreceptors.<sup>4</sup> Neurons of this nucleus give off crossed and uncrossed axons, which ascend to the thalamus by way of the trigeminothalamic tract.<sup>5</sup>

The fifth cranial nerve, the trigeminal, has three major divisions: the ophthalmic (V1), the maxillary (V2), and the mandibular (V3). It emerges on the mid lateral surface of the pons as a large sensory root and a smaller motor root. The cell bodies of the sensory root are located in the semilunar or trigeminal ganglion on the floor of the middle cranial fossa.

The ophthalmic, maxillary and mandibular branches jointly emerge from this root and distally exit the skull through the superior orbital fissure, foramen rotundum, and foramen ovale respectively. The ophthalmic nerve and occasionally the maxillary nerve course through the wall of the cavernous sinus. The motor root travels with the mandibular division. Within the pons, many of the sensory axons bifurcate and send a branch to the pontine trigeminal nucleus thought to be concerned with touch sensation from the face, and caudally to the nucleus of the spinal tract. All three divisions of the trigeminal nerve have meningeal branches.



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The ophthalmic division (V1) innervates the anterior cranial fossa and is formed by the nasociliary, frontal, and lacrimal nerves at the posterior aspect of the superior orbital fissure. It includes a meningeal branch to the tentorium cerebelli. The maxillary division (V2) is joined by small meningeal branches from the dura of the medial part of the middle cranial fossa as it enters the trigeminal ganglion. Sensation from the meninges of the lateral part of the middle cranial fossa is carried by the meningeal branch of the mandibular nerve (V3), which travels with the middle meningeal artery through the foramen spinosum. This nerve is called the nervous spinosus and joins the main trunk of the mandibular nerve prior to returning to the cranial cavity through the foramen ovale.<sup>6</sup>

Most eye pain is due to ocular disease. The ophthalmic nerve mediates pain, temperature and touch from the cornea, iris, upper lid, conjunctivae, lacrimal gland, and the bridge and tip of the nose. The non-ocular distribution of the ophthalmic division is of major clinical importance since disturbances of intracranial structures including dural venous sinuses, cerebral arteries, and veins all typically refer pain to the eye, orbit or brow. However, referral of pain from dural stimulation is not sufficiently specific to provide precise clinical localization.<sup>7</sup>

Both the dura of the anterior cranial fossa and the anterior two-thirds of the superior sagittal sinus contain perivascular nerves, which follow the middle meningeal artery and the ethmoidal branches of the ophthalmic nerve. The meningeal branch of the ophthalmic nerve, the nervus tentorii, supplies the superior portion of the tentorium cerebelli, the dura of the entire cerebri, the falx, and the sinuses associated with them, namely, the superior sagittal sinus, inferior sagittal sinus, transverse sinuses, straight sinus, and superior petrosal sinus. All the dural nerves in the anterior and middle cranial fossa can be traced to trigeminal divisions.<sup>8</sup> More recent research confirms the innervation of the dura by the trigeminal nerve. The superior surface of the tentorium and the anterior cranial fossa is supplied by the ophthalmic division, while the floor of the middle cranial fossa is supplied medially by the maxillary division and laterally by the mandibular

division. The inferior surface of the tentorium and the posterior cranial fossa is supplied by fibers that travel with the recurrent branches of the first three cervical spinal nerves and the vagus nerve (CN 10). Sensory fibers that supply the walls of the proximal large intracranial arteries, veins and venous sinuses travel with the sympathetics. These fibers all terminate in trigeminal sensory nuclei, and are thus best categorized as "displaced" trigeminal fibers.<sup>9</sup>

Exploratory neurosurgery under local anesthesia has shown that pain produced from the dural sinuses and from pressure on the tentorium is referred to a distant site. Stimulation of the lateral aspect of the superior sagittal sinus in its posterior third causes pain, which is usually referred behind the ipsilateral eye or to the forehead. Likewise, ipsilateral retroorbital pain is produced from the lateral wall of the straight sinus and the upper wall of the transverse sinus. Lateral pressure on the free margin of the falx in its middle portion may refer pain behind the ipsilateral eye. Electrical stimulation on the tentorium may also refer pain to the frontal region or behind the ipsilateral eye. Pain described by patients while they were awake during these cases is described as sharp or pressing.<sup>10</sup>

Migraine or vascular headache is a common recurrent headache syndrome. The presence of neurological dysfunction in classic migraine differentiates this syndrome from common migraine, or migraine without aura. Aphasia, blindness, visual disturbance, hemiparesis, paresthesias and vertigo can occur with classic migraine. Pain is pulsing or throbbing and is frequently accompanied by photophobia, nausea and vomiting. It is unilateral in two out of three cases and is three times more prevalent in women than men. Cluster headache is an uncommon headache disorder, which is unilateral and periorbital. It spreads over the affected side and becomes sharp and severe. It is six times more prevalent in men than women. Associated symptoms include ipsilateral facial flushing, conjunctival injection, lacrimation, Horner's syndrome, and rhinorrhea.<sup>11</sup> Neurological and para-

sympathetic symptoms help distinguish migraine and cluster cephalalgia from a cervicogenic headache.

Causes of unilateral retroorbital cephalalgia may include ocular inflammation, migraine, herpes zoster, referred dural pain, sinusitis, and painful ophthalmoplegia syndromes. Neoplasms of the orbit, superior orbital fissure, cavernous sinus, and middle fossa affect the ophthalmic (V1) sensory distribution of the trigeminal nerve. Likewise, cerebellopontine angle tumors, trigeminal neurofibromas, and tentorial meningiomas also affect the ophthalmic division.<sup>12</sup> The syndrome of painful ophthalmoplegia combines ocular nerve palsies with pain in and about the eye. Lymphoma, metastatic tumor, pseudotumor, cavernous sinus thrombosis, intracavernous aneurysm, pituitary adenoma, meningiomas, cranial arteritis, and contiguous sinusitis are a sample of disease states, which may cause retroorbital pain with ophthalmoplegia.<sup>13</sup> Headache, nausea and vomiting and papilledema is the clinical triad associated with increased intracranial pressure caused by an enlarging tumor mass. Local effects of a brain tumor on adjacent meningeal vascular or neural tissues may produce focal signs before the tumor enlarges to the degree necessary to increase intracranial pressure. Headache is present in about one-half of patients with metastatic brain tumor and seizures are seen in one-fourth.<sup>14</sup> Tumors, which involve pain sensitive structures such as meninges, cause headache. Unless there is increased intracranial pressure, tumors, which do not involve pain sensitive structures, do not cause a headache.<sup>15</sup>

The nerves distributed to the spinal dura mater are the meningeal rami of spinal nerves. The nerves distributed to the dura mater covering the floor of the posterior cranial fossa are derived from the sympathetic trunk and from the upper three cervical spinal nerves. They enter the posterior cranial fossa by way of the foramen magnum, hypoglossal canal, and jugular foramen. The nerves to the dura mater, which enter the cranium by way of the foramen magnum, are branches of the meningeal rami of the upper three cervical nerves and supply the dura mater in the anterior part of the floor of the posterior cranial fossa. As they travel, these branches give off branches to the spinal dura mater and the ligaments surrounding the atlantoaxial joint at a level corresponding to the rostral end of the odontoid.

Branches of these nerves enter the cellular dura mater covering the clivus and extend rostrally to the region of the posterior clinoid processes. The nerves to the dura, which enter the cranial cavity by way of the hypoglossal canal and jugular foramen, are derived from the anterior rami of the first and second cervical nerves and from the superior cervical ganglion. They supply the dura mater, which covers the lateral and posterior wall of the posterior cranial fossa. They also accompany the vagus (CN X) and hypoglossal (CN XII) nerves which enter the posterior cranial fossa through the jugular foramen and the hypoglossal canal respectively.<sup>16</sup>

The gray matter of the brain stem that constitutes the pars caudalis of the spinal nucleus of the trigeminal nerve is continuous with the apical gray matter of the dorsal horns of the spinal cord. The trigeminocervical nucleus can be identified within this continuous column by the common distribution of primary afferent terminals of the trigeminal and cervical nerves. The trigeminocervical nucleus is defined as those cells in the upper three cervical regions that receive both a trigeminal and cervical peripheral input and is the essential nociceptive nucleus of the upper neck and head.<sup>17</sup> The neuroanatomical basis for cervicogenic headache is convergence within the trigeminocervical nucleus. Nociceptive neurons have receptive fields with the fields of both the trigeminal and the first three cervical nerves. Their central connections are poorly organized somatotopically, and information may be interpreted from anywhere within the trigeminocervical receptive fields. Thus, the possible sources of cervicogenic headache are any structures innervated by the cervical nerves C1, C2, and C3.<sup>18</sup>

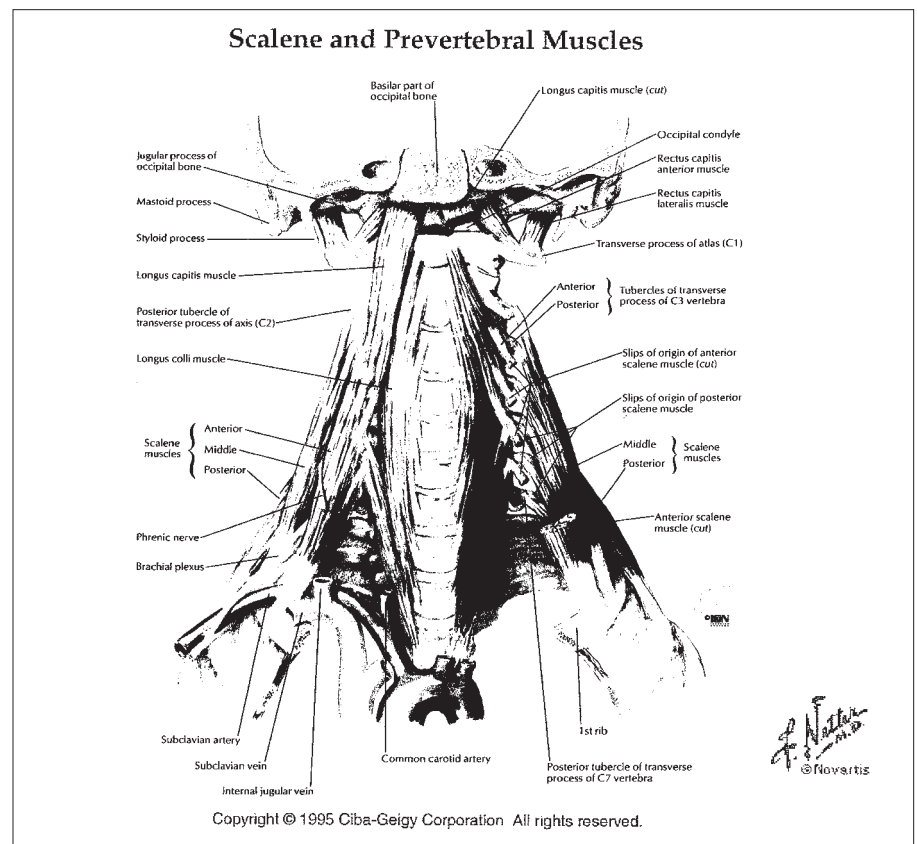
The ventral rami from C1 to C3 supply muscles of the cervical spine including the longus colli, rectus capitis anterior, rectus capitis lateralis, trapezius, and the sternocleidomastoid. The dorsal rami from C1 to C3 supply the atlantooccipital joint, the lateral atlantoaxial joint, the dura mater of the posterior cranial fossa, and the vertebral artery. They also innervate the suboccipital muscles which include the obliquus capitis superior, obliquus capitis inferior, rectus capitis posterior major and rectus capitis posterior minor muscles and supply the

semispinalis capitis, semispinalis cervicis, multifidus, longissimus and splenius capitis muscles and the zygapophysial joints between C2 and C3 and between C3 and C4. The sinuvertebral nerves from C1 to C3 supply the medial atlantoaxial joint, transverse and alar ligaments, and the intervertebral disc between C2 and C3. They also supply the dura mater of the spinal cord, foramen magnum, and clivus.<sup>19</sup>

Somatic Dysfunction is defined in the 'Glossary of Osteopathic Terminology' as "impaired or altered function of the somatic (body framework) system: skeletal, arthrodial, and myofascial structures and related vascular, lymphatic, and neural elements." Asymmetry, tissue texture changes, tenderness and restricted range of motion are the criteria used to define somatic dysfunction.<sup>20</sup> An in depth view of the osteology, ligamentous structure and muscle attachments of the occipital bone (C0), atlas (C1), and axis (C2) and the complexity of the interwoven structure and function in this occipitoatlantoaxial joint complex provide the basis for a causal relationship between somatic dysfunction at C1 with a laterally promi-

nent transverse process and an ipsilateral retroorbital headache.

The atlas (C1) is ring-like and consists of an anterior arch, a posterior arch and two lateral masses. The anterior arch contains a convex anterior surface with a tubercle for attachment of the longus colli muscle and a concave posterior surface with a circular facet for articulation with the odontoid process of the axis (C2). The anterior occipitoatlantal and anterior atlantoaxial ligaments arise from the upper and lower borders of the anterior arch and attach to the occipital bone above and the axis below. The posterior arch terminates in the posterior tubercle, which gives origin to the rectus capitis posterior minor muscle. It presents above and below a surface for the posterior occipitoatlantal and posterior atlanto-axial ligaments, which attach to the occiput and axis respectively. On the superior surface of the posterior arch, there is a groove behind each lateral mass for transmission of the vertebral artery and the first cervical (suboccipital) nerve. The lateral masses are bulky and present two articulating processes



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above and two below. The two superior processes are directed superiorly, medially and posteriorly and form a cup for the corresponding occipital condyle, which adapts to nodding movements of the head. They are sometimes subdivided by a deep indentation encroaching each lateral border. The inferior articular processes are circular, concave, and directed inferiorly and medially in order to articulate with the axis and permit rotary movements. The transverse ligament of the atlas arises from a tubercle on the inner surface of each superior articular surface. It stretches across the ring of the atlas and provides a smaller anterior separation for the odontoid process of the axis and a larger posterior separation for transmission of the spinal cord and its membranes. Due to its size, lateral displacement of the atlas may occur without compression of this structure. The transverse processes of C1 project in a lateral and inferior direction from the lateral masses and contain grooves for the vertebral arteries.<sup>21</sup> The rectus capitis anterior muscle arises from the anterior surface of the lateral mass and from the root of the transverse process of C1. It moves obliquely in a superior and medial direction and inserts on the basilar process of the occipital bone. The posterior surface relates with the front of the occipitoatlantal articulation. The rectus capitis lateralis muscle arises from the upper surface of the transverse process of C1 and inserts into the undersurface of the jugular process of the occipital bone. It approximates by its anterior surface the internal jugular vein, by its posterior surface the vertebral artery, by its lateral surface the occipital artery and by its medial surface the suboccipital nerve.<sup>22</sup> The obliquus capitis superior muscle arises from the tendinous fibers on the upper surface of the transverse process of C1, joins with the insertion of the obliquus capitis inferior muscle and then passes obliquely in a superior and medial direction to insert on the occipital bone.<sup>23</sup>

The occipital bone (C0) forms the posterior, inferior and anterior walls of the posterior cranial fossa, supports the lower portion of the pons, and provides an attachment point for the posterior tentorium cerebelli. Centrally, the foramen magnum allows passage of the spinal cord, accessory nerves, vertebral arteries, and the

anterior and posterior spinal arteries. The occipital bone also contains the foramen for the hypoglossal nerve.<sup>24</sup>

The axis (C2) contains the odontoid process, which serves as a pivot about which the atlas (C1) rotates and is the embryological body of the atlas. An anterior elongation overlaps the body of C3 and provides attachment for the anterior longitudinal ligament. The spinous process of the axis serves as the tendinous origin of the rectus capitis posterior major muscle, which inserts on the occipital bone and extends and rotates the head.<sup>25</sup> The obliquus capitis inferior muscle arises from the apex of the spinous process of the axis and passes obliquely in a lateral and superior direction to the inferior and posterior portion of the transverse process of the atlas.<sup>26</sup> A tectorial membrane arises inside the vertebral canal and extends as a cephalad projection of the posterior longitudinal ligament from the body of the axis to the occipital bone. Two alar ligaments project from the sides of the odontoid process to the occipital condyles and an apical odontoid ligament joins the apex of the dens to the foramen magnum. The transverse ligament of the atlas, which supports the odontoid process, attaches with a superior band to the occipital bone and with an inferior band to the body of the axis and forms the cruciform ligament of the atlas.<sup>27</sup>

Articulation between the occipital bone (C0) and atlas (C1) allows the movement of flexion, extension, lateral bending, and rotation. Panjabi, et al. speak of the region from C0 to C2 as the occipitoatlantoaxial joint complex. Using whole cadaveric cervical spine specimens, they described and measured range of motions of the occipitoatlantal (C0-C1) and atlantoaxial (C1-C2) joints in flexion, extension, lateral bending and axial rotation. Range of motion was obtained as a sum of the neutral zone and elastic zone and was measured between C0 and C1 as 3.5 degrees in flexion, 21 degrees in extension, 5.5 degrees in lateral bending, and 7.2 degrees in rotation. Between C1 and C2 there was measured 11.5 degrees in flexion, 10.9 degrees in extension, 6.7 degrees in lateral bending, and 38.9 degrees in axial rotation.<sup>28</sup>

The rectus capitis anterior and the rectus capitis lateralis are two of the four

anterior vertebral muscles along with the longus capitis and longus colli, which assist in flexing the head.<sup>29</sup> The rectus capitis anterior, rectus capitis lateralis, and longus capitis muscles help produce flexion, rotation, and lateral bending at the occipitoatlantal joint. The rectus capitis posterior major, obliquus capitis superior, and obliquus capitis inferior muscles are the posterior suboccipital muscles, which form the suboccipital triangle. Along with the rectus capitis posterior minor muscle they extend the head and assist rotation and lateral bending at the occipitoatlantal and atlantoaxial joints. As a general rule, flexion and extension of the vertebral column is accomplished when a paired muscle on both sides contract together. Lateral bending and rotation of the vertebral column is accomplished when a paired muscle contracts unilaterally.<sup>30</sup> Somatic dysfunction of the regions including the occipital bone, the atlas, and the axis involves the sensory distribution of the first three cervical spinal nerves and engages the trigeminal system through the trigemino-cervical nucleus. Increased tonicity or injury to these muscle groups can activate the same system that produces unilateral retroorbital headaches.

It should be noted that the floor of the suboccipital triangle contains the posterior arch of the atlas, the posterior occipitoatlantal ligament, the vertebral artery and the posterior division of the suboccipital nerve. The posterior occipitoatlantal ligament connects superiorly to the posterior margin of the foramen magnum and inferiorly to the posterior arch of the atlas. It is intimately blended with and adherent to the underlying dura mater of the spinal canal.<sup>31</sup> Researchers at the University of Maryland Dental and Medical Schools showed a connective tissue bridge between the rectus capitis posterior minor muscle and the posterior spinal dura. They observed dense connective tissue attaching the deep surface of the rectus capitis posterior minor muscle to the complex of the posterior occipitoatlantal ligament and the spinal dura at the atlantooccipital junction.<sup>32</sup>

Anterior and medial to the rectus capitis anterior muscle is the pharyngobasilar fascia and the pharyngeal raphe which attaches at the pharyngeal tubercle of the occipital bone and is a direct connection

of the superior pharyngeal constrictor muscle. The retropharyngeal lymph nodes that connect to the deep lateral cervical (internal jugular) lymph nodes also lie anterior and lateral to the rectus capitis anterior muscle. The C1 nerve root has direct communication with gray rami from the superior cervical ganglion and with the vagus (CN X) nerve. It branches directly to the rectus capitis lateralis, longus capitis, and rectus capitis anterior muscles.<sup>33</sup> The greater occipital nerve (dorsal ramus of C2) emerges below the inferior capitis oblique muscle and turns upward to cross the suboccipital triangle and reaches the scalp by piercing the semispinalis capitis, splenius capitis and trapezius muscles. The occipital artery crosses the insertion of the obliquus capitis superior muscle as it courses medialward to join and distribute with the greater occipital nerve. The suboccipital nerve (C1) has no cutaneous distribution. The greater occipital nerve (C2) distributes cutaneously to the vertex of the scalp medially and to the proximity of the ear laterally.<sup>34</sup>

The arterial blood supply to the spinal cord consists of the anterior and posterior spinal arteries, which originate from the two vertebral arteries. The posterior spinal arteries originate in the region of the medulla oblongata and descend through the foramen magnum and run posterior to the dorsal roots of the spinal nerves. The veins of the spinal cord communicate with the intervertebral veins and terminate in the inferior petrosal sinus. They interconnect with multiple venous plexuses in the vertebral column and also act as channels from all parts of the body. They terminate in the vertebral veins and the condyloid emissary veins. There are also terminations in the Basilar plexus and the occipital sinus.<sup>35</sup>

Primary somatic dysfunction is characterized in early stages by vasodilation, edema, tenderness, pain and muscle contraction. The positional and motion aspects of somatic dysfunction of the spinal column may be described using three parameters: (1) the position of the vertebral element as determined by palpation; (2) the direction in which motion is freer; (3) the direction in which motion is restricted. Chronic somatic dysfunction is characterized by tenderness, itching, fibrosis, paresthesias and contracture.<sup>36</sup>

The rectus capitis anterior and longus capitis muscles cause flexion between the occiput and the atlas and restrict range of motion in extension. Contraction of extensor muscles including the sternocleidomastoid, upper trapezius, semispinalis capitis, longissimus capitis, splenius capitis, obliquus capitis superior, rectus capitis posterior major, and rectus capitis posterior minor muscles cause extension between the occiput and atlas and restrict range of motion in flexion. Lateral bending between the occiput and the atlas is affected by the trapezius, sternocleidomastoid, splenius capitis, rectus capitis anterior, rectus capitis lateralis, rectus capitis posterior minor, and obliquus capitis superior muscles.<sup>37</sup> Altered range of motion or tissue texture changes affecting these muscles will cause somatic dysfunction at the occipitoatlantal joint.

At the atlantoaxial joint, somatic dysfunction occurs with altered function and restricted range of motion primarily with rotation to the right and the left. With extension, the rectus capitis posterior major muscle rotates the cranium, with the atlas, around the odontoid process of the axis and turns the head to the same side. With extension, the obliquus capitis inferior muscle rotates the atlas and with it the cranium around the odontoid process to the same side. The obliquus capitis superior muscle, acting on the cranium and the transverse process of C1, rotates the head to the opposite side with extension.<sup>38</sup> Also acting on the atlantoaxial joint is the sternocleidomastoid muscle, which rotates the head to the opposite side and the semispinalis capitis, longus capitis, splenius capitis, and longissimus capitis muscles, which rotate the head to the same side.<sup>39</sup>

Muscles, which attach and/or act directly at the transverse process of C1 include the rectus capitis lateralis, rectus capitis anterior, rectus capitis posterior minor, obliquus capitis superior and obliquus capitis inferior.<sup>40</sup> Acting indirectly on the transverse process of C1 is the medial border of the suboccipital triangle, namely the rectus capitis posterior major muscle, whose origin at C2 and insertion at C0 is shared by the obliquus capitis inferior and obliquus capitis superior muscles respectively. These two remaining borders of the suboccipital

triangle share their own respective insertion and origin at the transverse process of C1.

In the fall of 1991, three patients presented to my office over a five-week period with severe unilateral retroorbital pain and associated pain in the upper cervical region on the same side. The pain was described as throbbing and constant, and its duration was greater than twenty-four hours. Analgesics had minimal therapeutic affect on the headache. During the course of the history and physical examination, the patients denied parasympathetic symptoms associated with a migraine such as nausea, vertigo or associated aura. There was marked tenderness, contraction and spasm of the suboccipital muscles on the same side as the headache, and the upper cervical paraspinal musculature was extremely tender with spasm and mild edema on that side. There were similar but lessened symptoms on the opposite side. In each of these cases, the pain was severe and palpation alone increased the pain of the ipsilateral headache. The patients were not able to endure range of motion testing, as even the smallest amount of movement to the cranium or cervical spine would make the pain worse. Any attempts at treatment with soft tissue manual medicine modalities including gentle manual cervical traction caused the pain to increase. Attempts to find position of ease at the occipitoatlantal joint or the atlantoaxial joint in the planes of flexion, extension, rotation or lateral bending also failed due to marked spasm. Palpation of the transverse processes of C1 revealed a noticeably tender, painful and laterally prominent transverse process on the same side as the headache. This finding was not subtle and was perceived through palpation as a hard bony projection of the lateral transverse process of C1 much closer to the surface on the side of the retroorbital headache and upper cervical somatic dysfunction.

The transverse processes of C1 project so far laterally that they can be easily palpated by pressing inward between the mandibular angles and the mastoid processes.<sup>41</sup> A CT scan of C1 showed an equal distance of 3.5 cm from the skin surface to the lateral aspect of the transverse processes of the author. A random



sampling of ten adult CT scans showed a range of 3 cm to 5 cm from skin surface to lateral transverse processes. With palpation of this region, obvious care must be taken to avoid the styloid process of the temporal superiorly and the hyoid bone inferiorly. Palpation is easier with the patient in the supine position and the examiner seated at the head of the table. The examiner should approach from an inferior and lateral direction and use the volar surfaces, not the tips, of the second distal phalanges. Palpation should be anterior to the sternocleidomastoid muscle on a line midway between the mastoid processes and the angle of the mandible. It is biomechanically possible that the combined three-dimensional forces applied to the transverse processes of C1 will produce a vector (magnitude plus direction) which provides motion laterally along the transverse line formed by the union of the coronal plane and the transverse plane intersecting through the transverse processes of C1. The motion is described as lateral translation and is side to side. It is freer to the side of the retroorbital headache and the laterally prominent transverse process. Conversely, motion is restricted to the opposite side and the less prominent transverse process. In these three cases, palpation of the atlas was perceived as sagittally neutral with severe restriction in all planes of motion at the occipitoatlantal joint and atlantoaxial joint with the exception of lateral translation toward the side of the laterally prominent transverse process of C1. Somatic dysfunction at this level in the occipitoatlantoaxial joint complex may be described as lateral translation due to pain, tenderness, and tissue texture changes at the laterally prominent transverse process of C1.

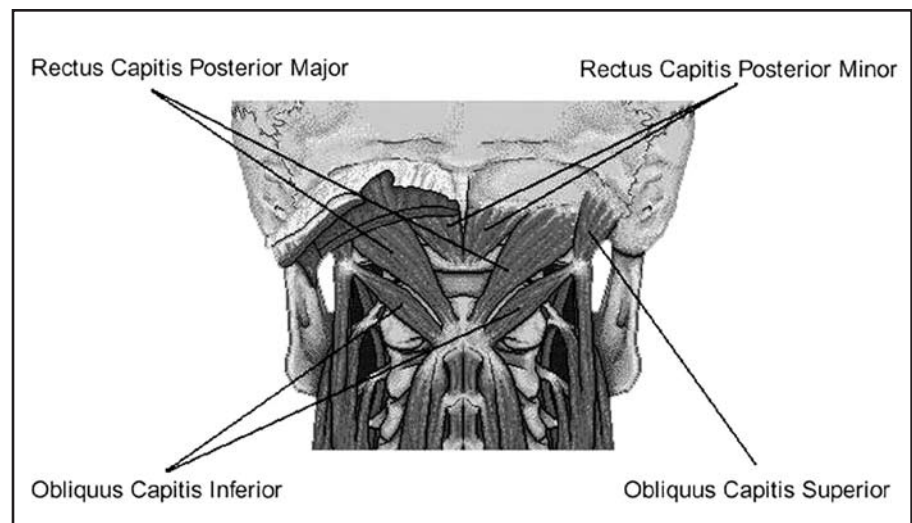
Greenman states that the C0-C3 complex functions as an integrated unit and recognizes the need to look at each level both individually and within its function in the overall complex. He also states that there are coupled sidebending and rotation movements to the opposite side which are quite small between the occiput (C0) and the atlas (C1), and that lateral bending between the occiput and the atlas occurs with the occipital condyles moving superior on one side of the atlas and inferior on the side of lateral bending between the occiput and the atlas.<sup>42</sup>

Thus, a left lateral “sideslip” of the occiput on the atlas produces a somatic dysfunction of right lateral bending and left rotation at the occipitoatlantal joint. Kuchera and Kuchera describe this somatic dysfunction and show that the mastoid process on the left is more lateral to the left transverse process of C1 and that the mastoid process on the right is closer to the more prominent right transverse process of C1. They also observe that the right suboccipital triangle feels firmer and more tender to deep palpation than on the left.<sup>43</sup> Jones states that the occipitoatlantal joint may have evidence of a lateral strain with tenderness at the tips of the transverse process and that “the atlas bone appears to slide away from the side of lateral convexity of the strain and the distance between the mastoid tip and transverse process of the vertebrae will be different on the two sides.”<sup>44</sup>

As this somatic dysfunction of right lateral bending and left rotation at the occipitoatlantal joint becomes more severe, it will involve the entire occipitoatlantoaxial joint complex as the strain in the suboccipital muscles on the right side increases in an attempt to rotate the cranium to a neutral position and to prevent sidebending. This homeostatic mechanism also involves recruitment of the left sternocleidomastoid muscle and the right semispinalis capitis muscle. As stated, it is biomechanically possible that the vector resolution of these increased forces acting at the right transverse process of C1 will produce increased lateral translation and

prominence of the transverse process. By convention, somatic dysfunction is described by naming the superior segment in relation to the inferior segment. A proper description of this somatic dysfunction would be left lateral translation between the occiput (C0) and the atlas (C1) and right lateral translation between the atlas (C1) and the axis (C2).

Bogduk states that pressure on the dura itself may activate the trigeminal system intracranially with a mechanical strain capable of producing a headache.<sup>45</sup> Along with an overwhelming increase of neuronal activity involving the C1 nerve root, the trigeminocervical pathway may also be activated by increased mechanical pressure caused by tension at the rectus capitis posterior minor muscle and its bridge to the posterior spinal dura through the posterior occipitoatlantal ligament. This overload of the trigeminal pathway at C1 is capable of producing a severe unilateral retroorbital headache. An increase of mechanical pressure may also be caused by the effect of the rectus capitis posterior major on the fibers of the rectus capitis posterior minor muscle. An interesting observation is that the sum of the force vector of the obliquus capitis superior which is directed from its insertion at the occiput (C0) to its origin at the transverse process of C1 and the force vector of the obliquus capitis inferior which is directed from its insertion at the transverse process of C1 to its origin at the spinous process of C2 is the same magnitude and direction as the force vec-



Reprinted with permission from *The Dynamic Spine*.



tor of the rectus capitis posterior major muscle which is directed from its insertion at the occiput (C0) to its origin at the spinous process of C2 and may indirectly add mechanical force to the rectus capitis posterior minor muscle with its bridge to the posterior cranial fossa.

Hallgren, et al. proposed a link between idiopathic head and neck pain and a cervical myodural bridge, which was named by James Lipton, DO, FAAO,<sup>46</sup> and postulated that increased tension in the rectus capitis posterior minor muscle would increase tension in the pain sensitive spinal dura by means of this connective tissue joining of the musculoskeletal system and the dura mater.<sup>47</sup>

Following discovery of the palpatory abnormality of a painful and laterally prominent transverse processes of C1 and a unilateral retroorbital headache on the same side, it was observed that an indirect osteopathic treatment directed at the transverse processes of C1 was tolerated by the patients and produced a therapeutic effect which stopped the headache and allowed for further treatment of the upper cervical and suboccipital region. The treatment began by using palpatory contact to support the affected tissues and allowing lateral translational motion to continue toward the skin surface of the laterally prominent transverse process along the transverse axis previously described. The amount of pressure applied to the transverse processes is similar to the pressure that one would apply to a marble, which was on a hard surface beneath a moist sponge of approximately 1 and 1/2 inches. The pressure needed would be the minimal pressure to make contact with the marble and to allow it to move freely along the hard surface. Following approximately one minute of treatment, the tissue texture changes at the laterally prominent transverse process began to soften and the transverse processes of C1 were allowed to move partially toward a more neutral position. Treatment to this area can last up to ten minutes and consists of a gentle resetting of the transverse processes to a normal position in a stepwise manner. The treatment has distinct intervals and can be described as applying pressure towards the side of the laterally prominent transverse process, waiting for relaxation and tissue texture changes, allowing movement

toward neutral with supporting pressure, waiting for the tissues to reset, and restarting the process until a maximum therapeutic effect is obtained.

In Chapter 11 of *Modern Neuromuscular Techniques*, Dennis J. Dowling, DO, FAAO reviews neuromuscular techniques and the osteopathic modality of inhibition. The described osteopathic treatment utilizes the physiologic principles of inhibition and other osteopathic techniques described by Dr. Dowling including functional, strain/counterstrain, myofascial release, and facilitated position release.<sup>48</sup>

With a strain or sprain to muscle fascia, impulses from Golgi tendon organs and muscle spindle proprioceptors affect gamma gain and attempt to hold a joint in a strain. With proper joint positioning, spindles can be shortened and relaxed in the agonist muscle and stretched in the antagonist. Resetting proprioceptors using this principle was first developed by Larry Jones, DO, FAAO in his "Strain and Counterstrain" technique.<sup>49</sup> Muscle is integrally related to its fascia and bioelectrical properties. Restoration of the tissues involved with lateral translational somatic dysfunction in the occipitoatlantoaxial joint complex uses bioelectric fascial activation and release manipulative approach introduced by the Founder of Osteopathy, Andrew Taylor Still, MD, in the beginnings of osteopathy and more recently developed by Judith O'Connell, DO, FAAO in *Bioelectric Fascial Activation and Release*.<sup>50</sup>

A research survey in August of 2003 using the "Yahoo" web site showed 2360 articles written on cervicogenic cephalgia and the existence of a "Cervicogenic Headache Society." A survey in March of 2004 showed 3311 articles. This paper has attempted to provide an anatomic and physiologic case for the clinical observation of the relationship between a painful and prominent transverse process of C1 and a retroorbital headache to the same side. Hopefully, somatic dysfunction involving the trigeminocervical pathway from C0 to C3 will be added to the "International Classification of Headache" and help clinicians look to somatic dysfunction at C1 as a possible cause of unilateral retroorbital cephalgia and avoid a misdiagnosis of either an ocular migraine or a cluster headache.

## Acknowledgments

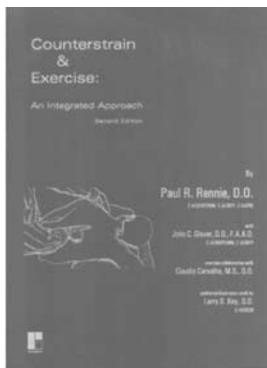
The author wishes to thank Pat Coughlin, PhD, John Jones, III, DO, and Mark Bailey, DO, PhD for their assistance in the research and editing of this paper.

He would also like to dedicate this paper in memory of Nicholas Nicholas, DO, FAAO and David Heilig, DO, FAAO for their inspiration and dedication.

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1. The meningeal branch of the ophthalmic nerve, the nervus tentorii, supplies which intracranial structure.
  - a. The falx
  - b. The dura of the entire cerebri
  - c. The transverse sinuses
  - d. The superior portion of the tentorium cerebelli
  - e. All of the above.
2. The posterior cranial fossa is supplied by fibers that travel with the vagus nerve and the recurrent branches of the first three cervical nerves.
  - a. True
  - b. False.
3. The dura mater of the spinal cord, foramen magnum, and clivus is innervated by:
  - a. The ventral rami from C1 to C3.
  - b. The dorsal rami from C1 to C3.
  - c. The sinuvertebral nerves from C1 to C3.
  - d. All of the above.
  - e. None of the above.
4. According to Panjabe, et al., which is an accurate description of range of motion in the occipitoatlantoaxial joint complex?
  - a. Occipitoatlantal rotation: 6.2 degrees.
  - b. Atlantoaxial flexion: 11.5 degrees.
  - c. Occipitoatlantal lateral bending: 4.5 degrees.
  - d. Atlantoaxial lateral bending: 7.6 degrees.
  - e. None of the above.
5. The floor of the suboccipital triangle contains:
  - a. The posterior arch of the atlas.
  - b. The posterior occipitoatlantal ligament.
  - c. The vertebral artery.
  - d. The posterior division of the suboccipital nerve.
  - e. All of the above.

*Answer sheet to  
 June 2005  
 AAOJ CME  
 quiz will appear  
 in the September  
 2005 issue.*

**March 2005  
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 answers:  
 1. D  
 2. B  
 3. D  
 4. B  
 5. D**

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# Abreactions in Ligamentous Articular Strain

Laura McMurrey and Stuart F. Williams

## Introduction

An abreaction is defined by Merriam-Webster as “the expression and emotional discharge of unconscious material (as a repressed idea or emotion).” In the 1940s, psychiatrists began to think that such a release of pent-up feelings and energy may be essential to moving forward in one’s personal emotional evolution. It was found that intravenous injections of sodium amytal helped patients into a state in which they were less likely to “shut off” emotions that they had a tendency to avoid in traditional psychotherapy and in everyday interactions.<sup>1</sup> However, patients do not require pharmacological substances in order to experience a spontaneous release of previously repressed feelings and the physical response that accompanies it. The phenomena of abreaction has been documented in intense sessions of traditional therapy, in massage therapy, in the alternative medical fields of body energy work and acupuncture, and it has been documented in craniosacral and osteopathic manipulative treatment of these patients with post-traumatic stress similar chronic disease processes (fibromyalgia, chronic pain syndrome, and similar diagnoses).

## Case Report

C.S. is a 48-year-old white female who presented to the office with acute low back pain for the last two days. She was originally referred to the clinic for osteopathic manipulative treatment by her massage therapist for left buttock and low back pain with symptoms of sciatica that were not constant. She was last seen at this clinic one year ago for low back pain and left hip pain, and told us that she had avoided returning to the clinic since that time because of her post-treatment reaction. She told us that she had felt weakness on her entire left side on the day following

her last treatment. Significant past medical history includes a head injury with concussion, a whiplash injury, and problems falling asleep and with staying asleep. She currently has problems with back pain, left-sided numbness and tingling, left-sided weakness, anxiety, depression and chronic pain syndrome (CPS). She was diagnosed with CPS seven years ago, and her pain tends to involve primarily the left side. She is currently under the care of a neurologist, a psychotherapist, an acupuncturist, and a massage therapist for the management of her CPS, and she has occasionally sought osteopathic treatments as well. She denies the use of alcohol or illegal drugs, and her current medications include Neurontin, Celexa, BuSpar, trazodone, and synthetic thyroid hormone. Also of potential importance is that her last menstrual period occurred four months ago.

Osteopathic findings were as follows: iliolumbar ligament tension, muscular spasms of the external rotators of the hip on the left, sacral torsion with the right ILA markedly inferior, fascial tension deep within the upper thighs bilaterally and a tight inguinal ligament on the left. All areas were treated with ligamentous articular strain as they were found. During the release of the left inguinal ligament, the patient expressed that she was in quite a bit of discomfort and that she felt very uneasy. This was not an unexpected reaction, as treating patients with ligamentous articular strain includes applying a moderate to deep pressure to ligaments, tendons and muscles that have gone into spasm and are quite often tender.

## Discussion

The concept of ligamentous articular strain involves the treatment of allocation in the body that has reacted to an outside stressor. The inciting event to which

the patient is reacting is most often of a traumatic nature. The trauma may be physical, such as physical abuse, sexual abuse, or the trauma of a car accident; or it may be emotionally traumatic, as with the 43-year-old with recurrent nightmares from the time he was 16 following the witness of his brother’s suicide.<sup>1</sup> Often, these initial events fail to resolve themselves and can become chronic in nature. This is often diagnosed as post-traumatic stress disorder by psychiatrists. War veterans are a favorite source for research on post-traumatic stress disorder, as they have often been the victims of both physical and emotional trauma on the battlefield. In practice, osteopathic physicians tend to focus on physical stressors as these are more easily remembered by the patient and patients tend to be more likely to discuss physical trauma. Physical causes are also more easily explained and treated by the typical physician. When tissue has been altered and is no longer in balance at a neutral position with respect to the surrounding tissue, this point becomes a *reaction point*.<sup>2</sup>

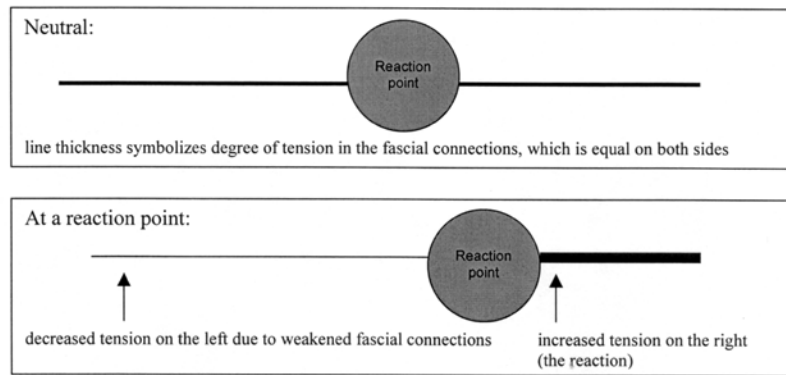
Treatment involves three basic steps, with the goal of bringing the tissue holding the reaction back to the neutral point, where it is able to function at peak performance. We must first understand the background fundamental concepts on which ligamentous articular strain was built. It is the belief of many physicians currently using and studying these methods of osteopathic treatment that the cranial rhythmic impulse, more commonly referred to as “the tide”, is present not just within the central nervous system but throughout the body.<sup>3</sup> We learned in our basic anatomy and physiology classes that not every cell within the body is directly in contact with a capillary or blood vessel. In order for these tissues to receive nourishment and for their waste products

to be carried away, we learned that the interstitial fluid carrying nutrients from the blood vessels must wash over these cells, and then retreat back to the vessels carrying the waste.<sup>2</sup>

Osteopathic physicians treating with LAS believe that this fluid movement is indeed related the tide of the cranial rhythmic impulse, in fact is governed by it.<sup>3</sup>

The first step in a ligamentous articular release treatment is often referred to as *disengagement*. It involves loosening the point of the reaction from the tissues around it. The patient typically perceives these *reaction points* as areas that are more tender on palpation than surrounding areas. These may be anywhere on the body, and can occur in ligaments (as the description implies) or in tendons, muscle, fascia, and even in the bones themselves (although these are very difficult to palpate).<sup>3</sup> A common example of such a reaction point often treated by LAS is the piriformis tenderpoint (in fact each of the six external rotators of the hip between the greater trochanter and the sacrum will often have these reaction tenderpoints). Disengagement of the reaction point is done by applying a fair amount of pressure to the point until it begins to move somewhat on its own. Occasionally, traction (also referred to as distraction) is instead required to disengage the reaction. The reaction point has now been loosened from the tensions that held it. Once the point is disengaged, the second step involves taking the reaction to a place of balanced tensions. This will typically involve an exaggeration of the lesion, but only to the point at which all tensions are equal.<sup>2</sup>

The reason exaggeration is required to reach a point of balanced tension can be confusing. The existence of a reaction point is defined as tissue that is not at its neutral resting point. It has deviated from neutral and it is being suspended there by malfunction of the surrounding fascial connections: on one side of the lesion is a weak element, which allows the reaction to move further away. On the other side of the lesion, the fascial connections responsible for suspending the reaction point have tensed up and are pulling the reaction point in that direction (see figure). Exaggeration of this lesion is required to (a) bring tension into the weakened connection, and to (b) decrease



the tension exerted on the lesion by the contracted side.<sup>3</sup>

The third step involves maintaining an equal tension in all directions as the tissues begin to relax and regain their original tensions. The palpatory experience of this readjustment of the tissues is quite similar to that of myofascial release, except that the pressure applied and the tissues affected are generally much deeper than the superficial fascia. These two techniques often overlap. The treatment is complete when the tide can be felt at the reaction point, palpated as the reaction point itself moving back and forth between its suspensions, with equal amplitude in both directions, at a rate of 8 to 14 cycles per minute (the rate of the cranial rhythmic impulse).

### Case report (continued)

Following treatment of the patient's tight left inguinal ligament, reaction points between the patient's ribs were treated both anteriorly and posteriorly. During this time, the patient began to tremor slightly. She seemed very concerned about this, which was appropriate as it was unexpected and was restricted to primarily the left side. Within a couple of minutes, her tremor was so intense that she appeared to be shivering severely. Her jaw was also quivering to the point that she had to use her hands to steady her jaw so that we could understand her. At this point, the physician recognized her body's reaction as an increased surge of sympathetic output, and began a CV4 cranial technique with the purpose of rebalancing the autonomic output. With the CV4 treatment, her tremor improved significantly, and she requested a moment to sit up and recompose herself. We

explained to the patient that her reaction was due to a surge of sympathetic output, which appeared most directly to be a result of the treatment of the inguinal ligament. During this discussion, the patient revealed to us that she was a survivor of incest. We now had all of the ingredients for an abreaction according to its definition: the inciting trauma (both physical and emotional), and the expression and emotional discharge of unconscious material, coupled with a sympathetic surge that would be expected when experiencing such intense feelings.

### Review of Literature

Literature on the connection between any form of osteopathic manipulation and abreaction is minimal. There are, however, several references to the interconnections between lesions of the musculoskeletal system and the autonomic nervous system, and to the importance of fascia in mechanical pain syndromes and more importantly in this case, in persistent pain syndromes.<sup>4</sup> *Foundations for Osteopathic Medicine* states that "a decreased threshold to stimuli is applied above or below the segment [of the osteopathic lesion] and can result in increased efferent somatic (muscle contraction) and autonomic activity."<sup>5</sup> The neurobiological theory in psychiatry maintains that physical symptoms whose cause cannot be determined by current standards of diagnosis (CT scan, MRI, etc.) result from dysfunction in the neuroendocrine systems responsible for processing peripheral *sensory* AND central *emotional* information.<sup>6</sup>

There are also references to the benefit of abreaction in psychiatric progression (i.e., the *Spirit* portion of the osteopathic

philosophy) and between emotions and the autonomic nervous system. Within the realm of psychotherapy, it is commonly felt that painful, abusive experiences need to be uncovered before treatment can progress and that uncovering such memories can often be helpful.<sup>7</sup> It is also well documented that feelings and perceptions influence the muscular and autonomic activity of the body, as well as the ability of the body to respond to exogenous influence (e.g., OMT)<sup>5</sup>

## Summary

It is clear that more research and case discussions must be presented and reviewed before the connection between abreaction and osteopathic manipulative treatment well known as a potential outcome and before physicians are able to recognize it for what it is. One osteopathic physician in Florida who has limited his practice of medicine and manipulation to only craniosacral manipulation has coined the term "somatoemotional release." However, his references to this

phenomenon are discussed as a response to craniosacral therapy. Abreactions occurring in response to other forms of manipulation require closer investigation, which cannot occur until reporting such reactions becomes routine in the practice of OMT.

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# Be Careful with this Kind of Case!

Richard C. MacDonald

## *WF, 44yr, Married, No Children*

The above patient has been seen by me on numerous occasions for cephalalgia and low back pain. Except for a recurring viral type lesion on the lip she was in good health. She had a history of sexual abuse, malignancies X 2, one abortion, colitis and concussions. When first seen for the following c.c. she had recently had the flu. I had not seen her in our office since November 2000.

On December 28, 2000 the patient walked into the narrow edge of a door during the-night. She struck her left frontal region. The force of the injury caused her to fall on to her back on the floor. She did not strike her head nor was she unconscious from the fall to the floor or from the initial head trauma.

On the January 10, 2001, the patient began to have notable symptoms which were:

- 1- Severe pain to her right face, throat, TMJ, and head.
- 2- She had lost her sense of taste and later began to develop nausea and vomiting.
- 3- Later the vomiting stopped and she had difficulty eating, swallowing, and inability to concentrate.
- 4- She developed a right eye soreness and a drooping eye lid (Homers Syndrome), which still returns slightly when she is stressed by the return of the above symptoms 1 and 2.

On structural evaluation she had some of her usual cervical muscle tension. She had minimal vertebral or sacral dysfunction to explain the severity of her symptoms. Her cranial and dural tube motion was easily mobilized. Cranial Somatic Dysfunction was present:

- 1- Frontal compression
- 2- Sphenobasilar compression
- 3- Right lateral strain
- 4- Right temporal externally rotated
- 5- C2 side bent left

## 6- T5-7 forward bent

She was seen again the next day by me; neurological exam was normal and the somatic dysfunction was much improved. I saw her two days later and she was not much improved, but all somatic dysfunction was much improved except C2, which was mobilized with thrust bilateral in a flexion posture. I felt the viral trigeminal neuralgia would subside over the next several days if the somatic dysfunction mobilization was related. She was told if she was not improved to get another opinion. I saw her only during symptoms 1 & 2.

Cat Scan of her head was done to rule out a contrecoup subdural hematoma. No abnormal cranial findings were present on the Cat Scan. She also had blood work and all was normal even the Sed Rate. She had no family doctor in our area. She went to an outpatient clinic and the doctor at the clinic agreed with my diagnosis of viral trigeminal neuralgia. But, the patient continued to have the same severe symptomatology. She could not get to see a neurologist here so she went to Atlanta and saw her family doctor who sent her to a neurologist. Both agreed with the trigeminal neuralgia diagnosis. He prescribed pain medications, which did not help.

Her symptoms continued and she happened to speak with a visiting friend who is a physician from South Africa. The physician encouraged her to have a cervical MRI with contrast. This procedure was performed and the basic cause of her trigeminal neuralgia (plus) was defined as a dissecting aneurysm of the internal carotid artery at the external portion of the foramen lacerum on the right with a formed clot. She was immediately placed on Coumadin for a six month period. Her pain improved and her taste slowly returned over a two week period.

She has had two mild flare ups since February, which have come under control once on its own and the other time by OMM

in May 2001. She may still have an intimal flap at the dissection site.

She continues to fly to many areas and do her regular business with continued improvement. She fly's under 5000 ft. and no scuba diving.

This case represents a non-typical example of trigeminal neuralgia. I believe that all of her symptoms were caused by over stimulation of the sympathetic nerves at the carotid dissection site. The sympathetics interacted with the cranial nuclei and/or ganglion of the 5th, 7th, 9th, 10th, and perhaps the 11th and 12th cranial nerves. This would probably represent a visceral-visceral type facilitation.

I believe that this case represents an example of a vector force causing an energy cyst, the dissecting aneurysm, which came early and then was followed by the clot formation over several days and causing the sympathetic neurological reaction.

There have been several studies by physical therapists regarding dissecting aneurysms of the vertebral artery due to manipulation of the upper cervical region by DCs and PTs. I have found that manipulative forces (thrust) are not necessary in a high percent of the time and never necessary in the infant, child and older adult. If the high velocity force is needed it should always be done with the patient's head on the neck in a forward bent posture. Incidentally, dissecting aneurysms of the internal carotid artery are usually diagnosed at autopsy.

It is interesting that a forward bent bilateral thrust to C2 did not cause a positive or negative reaction at treatment two. I will not miss this diagnosis again.Δ

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*Accepted for publication, April 2004*

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# American Academy of Osteopathy®

## Consensus Statement for Osteopathic Manipulation of Somatic Dysfunction under Anesthesia and Conscious Sedation

### **Background**

The purpose of Osteopathic manipulation with or without general anesthesia is to restore the patient to optimal health potential. This is accomplished by the proper use of those procedures that will restore normal motion to the specific joint(s) and the associated muscles and tissues found to be in a dysfunctional state.

Manipulation Under Anesthesia (MUA) is an OMT procedure, performed with the added benefit of conscious or general sedation of the patient. It is used to circumvent and overcome the conscious and unconscious defense mechanisms and natural resistance to treatment manifesting in some conditions. Research and publication on the utilization and efficacy of this procedure is limited.

### **Definitions**

Osteopathic Manipulative Treatment (OMT) is an osteopathic medical procedure involving the therapeutic application of manually guided forces by an osteopathic physician to improve physiologic function and/or support homeostasis. It is a form of manual treatment used to eliminate or alleviate somatic dysfunction and related disorders. This treatment may be accomplished using a variety of techniques including direct approaches such as muscle energy and high velocity-low amplitude (HVLA) thrust or impulse procedures, or indirect approaches such as strain/counterstrain, cranial osteopathy, and myofascial release (MFR) procedures, among others.

Somatic Dysfunction as used by osteopathic physicians and surgeons, is defined as "Impaired or altered function of related components of the somatic (body frame work) system; skeletal, arthrodiagonal, and myofascial structures; and related vascular, lymphatic, and neural elements."

It is further classified by body regions, including head, cervical, thoracic, lumbar, sacral, pelvic, lower extremity, upper extremity, ribs, and abdomen.

### **Indications**

Manipulation under anesthesia may be appropriate in cases of restrictions and abnormalities of function. These include recurrent muscle spasm, range of motion restrictions, persistent pain secondary to injury and/or repetitive motion trauma. Furthermore it is an alternative approach after failure\* to significantly improve with conservative treatment including but not limited to OMT, physical therapy and medication. In general, MUA is limited to patients who have somatic dysfunction which:

1. has failed to respond to conservative treatment in the office or hospital that has included the use of OMT, physical therapy and medication, and/or
2. is so severe that muscle relaxant medication, anti-inflammatory medication or analgesic medications are of little benefit, and/or
3. results in biomechanical impairment which may be alleviated with the use of the procedure.

\* Failure may be defined as a lack of significant response in 3-6 weeks in the acute phase, 6-12 weeks in the post-acute phase, and greater than 12 weeks in the chronic phase. In the chronic pain patient, these criteria may be met at the initial evaluation by an osteopathic physician.

### **Contraindications**

Manipulation under general anesthesia is contraindicated in the presence of

- \* primary or metastatic carcinoma in the area to be treated
- \* local bone or joint infection in the area to be treated
- \* acute fracture
- \* unstable spondylolisthesis
- \* acute inflammatory arthritis
- \* uncontrolled diabetic neuropathy
- \* evidence of spinal cord compression by tumor or disc herniation
- \* evidence of aortic aneurysm
- \* contraindications to general anesthesia or IV sedation, and
- \* any condition that would contraindicate direct manipulative techniques which would likely result in harm to the patient.

### **Relative Contraindications**

The physician may choose to proceed with caution and with documentation of his/her considerations on the chart in the presence of

- \* systemic infections
- \* previous MUA for the same problem performed within the previous three weeks, and
- \* radiographic evidence of advanced degenerative joint disease, osteoporosis or other condition of a degree in which MUA may result in harm to the patient.

### **Dosage and Frequency**

MUA is usually a single dose procedure. As with other OMT procedures, patients occasionally report post-treatment reactions. The reaction may last 24-48 hours, and includes muscle soreness usually relieved by rest, warm bath, and mild anti-inflammatory or analgesic medication. In some cases a follow-up MUA may be indicated after a three week interval. If a follow-up MUA is indicated with less than a three week interval, a second opinion is recommended. After

a second or follow-up MUA, any additional MUA considerations should be with the consensus of appropriate consultants. These may include a neurologist, orthopedic surgeon, physiatrist, and/or a specialist in osteopathic manipulative medicine or neuromusculoskeletal medicine and osteopathic manipulative medicine certified by the AOBNMM or AOBSPOMM.

### ***Recommended Physician Qualifications***

As a minimum, it is recommended that the physician performing the MUA procedure, should meet all of the following qualifications:

1. Be board certified (or board eligible) under the jurisdiction of an AOA certifying board. (See Grandfathering Guideline below.)
2. Have demonstrated skill in Osteopathic diagnostic and manipulative treatment procedures.
3. Have documented training and experience in manipulation under anesthesia.

#### *Grandfathering Guideline:*

Those osteopathic physicians currently credentialed to perform MUA and whose privileges are in good standing may be allowed to continue these privileges regardless of board certification by the AOBNMM or AOBSPOMM.

### ***Facility Guidelines***

MUA is a hospital or surgical center procedure. As a minimum, the physician administering the procedure should comply with all appropriate hospital or surgical center protocols.

1. A signed informed consent approved by the hospital or surgical center. The patient must be informed about their diagnosis, the procedure, alternatives, potential risks and possible complications.
2. The anesthesiologist/anesthetist is properly credentialed by the hospital or surgical center.
3. History and physical must be done prior to or upon admission.
4. All necessary laboratory reports, x-rays and other imaging studies, consultants' reports, etc. will be ac-

complished and charted prior to the procedure.

5. MUA may be performed as a same-day or in-patient procedure depending on the condition of the patient.
6. Hospital or surgical center quality management procedures apply.
7. The physician performing the MUA may be the attending physician or a consulting specialist.

### ***Disclaimer***

It is the intent of the American Academy of Osteopathy that this document be used as a guideline in establishing privileges for osteopathic physicians and surgeons for the use of Manipulation Under Anesthesia.

This document is not to be construed as an endorsement of efficacy or final criteria for implementation by a hospital/institution without appropriate review and implementation of the hospital or institution's own guidelines for Manipulation Under Anesthesia.

In reviewing this document, each hospital or institution must review, formulate and institute its own rules regarding qualifications, statistical monitoring and outcomes in establishing procedures, controls, and systems for Manipulation Under Anesthesia.

Revised March 16, 2005  
AAO Board of Governors

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# 15th Annual OMT Update

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- Information on CODING for manipulative procedures
- Good review with relaxation and family time

**PREREQUISITES:** The participant should have a basic understanding of functional anatomy and (1) Level II course.

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Friday, August 19 ..... 7:00 am - 1:30 pm  
Saturday, August 20 ..... 7:00 am - 1:30 pm  
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# Review of the Intelligent Body

R. Paul Lee

From across the Atlantic, osteopathy in the United Kingdom seems idyllic, philosophically pure, and unadulterated by allopathic influence. First-hand, I was not disappointed when I attended the Sutherland Cranial College's seminar and workshop, *The Intelligent Body*, April 16 & 17, 2005, in London, England. I was not only pleased to learn about scientific information that supports traditional osteopathic philosophy, but also about advancing ideas percolating through the minds of this osteopathic community. The urge to develop osteopathic philosophy is alive and surging in the U. K. On the first day, the seminar featured Stephen Levin, MD of Virginia and James Oschman, PhD, of New Hampshire, who lectured respectively on tensegrity and the living matrix. Then, on day two at the workshop, faculty of the Sutherland Cranial College of Osteopathy challenged the osteopathic students to clinically integrate these ideas through palpatory exercises.

Dr. Levin punctuated his presentation with good humor to emphasize that the concepts of tensegrity apply to the human body. He said that intervertebral discs don't hold you apart, they hold you together. Levin has independently studied tensegrity for all of thirty years, inventing the field of bio-tensegrity. He has concluded that the spine is not a stack of blocks bearing up against gravity. Rather, each vertebra, including the sacrum is suspended by triangulating fibers of connective tissue.

One could compare the sacrum to the hub of a bicycle wheel with the ligaments acting like the spokes. The pelvis serves as the outer rim of the wheel. There are only straight-line tensioning forces that angulate with each other to support the system. Compressive elements (bones) are discontinuous (like the hub), while tensional elements (muscles, ligaments, fascia) are continuous. Muscles create a

tone in the system operating fluid filled compartments in the body that end in joints. Joints, in general, are in tension, not compression. Changing the tension across a joint is to make the joint move. The joint is a frictionless plane which as Levin discovered cannot be compressed when synovial fluid is in place and ligaments are intact. This phenomenon does not follow Newtonian laws of physics. Due to tensegrity, the shoulder floats in muscle. There is very little connecting the shoulder to the axial skeleton. The scapula can be visualized as a sesamoid bone within the shoulder girdle.

Close packing changes spherical components in living systems to icosahedrons (20 equilateral triangles), the next best shape to a sphere that maximizes volume to surface area. Beneath the icosahedron are more basic octahedrons (eight triangular surfaces) and tetrahedrons (four triangles) into which icosahedrons can devolve. Foam offers a plausible model for the shape of connective tissue. In foam, spherical bubbles are compressed in standard ways: close packing produces 120 degree angles where any two adjacent films meet; three films meet to form an edge; four edges meet at a single point. Just such arrangements are seen not only in connective tissue but more dramatically in the structure of the honeycomb of the beehive and of the eye of the fly.

Microscopically, tensegrity is seen in the cytoskeleton, where microtubules serve as the discontinuous compression elements and microfilaments and intermediate filaments serve as the continuous tension elements. Mechanotransduction occurs across the cell membrane thanks to integrins, proteins imbedded within the membrane that are connected to both the extracellular matrix and the cytoskeleton. This means that all the cells and extracellular matrix exhibit a continuous mechanical

function right down to the genetic material in the nucleus. Vibratory information transmitted by this tissue tensegrity system activates enzymes and DNA. The icosahedron naturally oscillates between left and right-handed forms with a larger-volume, higher-energy, cubic octahedron as the intermediary. A veritable pumping action results as icosahedrons oscillate. Any energy put into the system (mechanical, electrical, ionic flows) activates this oscillation of life. Thus, within the connective tissues, functioning on both a metabolic and structural level is inseparable.

Icosahedrons exhibit the phenomenon of "stacking." Symmetrical placement of one icosahedron on top of another in long series is the basis for the formation of helices. Hydroxyapatite is a helix. DNA is a double helix. Collagen is a triple helix. Systems of helices form non-Newtonian pumps in which squeezing it increases the pressure. Examples of these are the heart, alveoli, bladder, bowel, uterus, and kidney.

Dynamical diseases are non-linear, such as asthma, anaphylaxis, IBS, hives, migraines. Ingber says they are related to mechanotransduction. They don't show pathology once healed.

Dr. Oschman focused on the living matrix (connective tissue matrix) in his exciting presentation. As a biophysicist and biologist, he has made a study of healing systems and the mechanisms by which they work. He published a groundbreaking book in 2000: *Energy Medicine: the Scientific Basis*, and more recently: *Energy Medicine in Therapeutics and Human Performance*. In his books as in this set of lectures he marries optimal health and healing with its underpinnings in science.

Oschman took the ball from Levin to show how the connective tissue matrix serves as a sensitive receptor and generator

of biological information. He indicated that many phenomena exist within the matrix as organizing forces for the entire organism. Water organizes itself using octahedrons of hydrogen bonds around the proteins of the matrix. This “structured water” vibrates and transmits various influences such as flows of ions. Electrons and protons are the actors for life on the surfaces of the matrix proteins.

Bioluminescence, low level emission of photons as part of the metabolic processes, communicates biological information from cell to cell, integrating functions across wide regions of the organism. The connective tissues participate in this process emitting most of the light from the heart, forehead, and palms of the hands. The frequency of the emitted light determines the effect, not the amplitude or the force. Cell membranes are constructed in such a way that they inherently vibrate at a very high frequency. When they vibrate synchronously, they are said to create “quantum coherence.” This communicates a tone of information that regulates the functions of the body, in general.

Mechanotransduction, a phenomenon of the fibrous part of the connective tissue matrix, participates in a vibratory communication from the matrix outside the cell into the cytoskeleton via the integrins and down into the nuclear genetic material, itself. And the reverse also occurs. Dr. Oschman declared that the DNA is the body’s master tuning fork, establishing a tone for the optimal functioning of the proteins. This is called “systemic cooperation” in which all parts of the person operate together. The heart causes resonances throughout the entire organism. The heart is constructed out of a single muscle strand that forms a double helix.

As one palpates the skin, one connects with this microscopic meshwork of the living matrix, thus permitting the ability to feel at a distance and to influence healing within the system. Oschman referred to healing as systemic cooperation in which the healer deeply connects with the patient and all parts of the patient work together. “Entrainment” may also play a role. This phenomenon results from synchronous vibrations between the healer and the patient.

Dr. Oschman went so far as to say that the connective tissues exhibit primary consciousness. Before the nervous system was phylogenetically established, the connective tissues controlled the function of multi-celled organisms. The function of these integrating phenomena of the connective tissues is very rapid. The movement of electrons and protons along the protein surfaces is nearly instantaneous. Whole regions of this fibrous meshwork share electrons. The more electrons the healthier is the tissue. Shininess of connective tissue is evidence for a plentiful supply of electrons.

Compared to the living matrix, the nervous system is slow. Nerve impulses and synaptic transport of neurotransmitters like acetylcholine require more time than common response times of the human body. For instance, neurology cannot explain a baseball batter’s ability to hit a pitched baseball traveling at 90+ miles per hour. The matrix consciousness explains this intuitive ability. Ted Williams, one of the greats in baseball hitting history said he studied the pitcher and then just guessed. This intuitive guessing is similar to the phenomenon of “second sight” in which a soldier who lost his sight in battle in World War I was still able to negotiate around objects. Oschman declares that the living matrix is the ultimate transducer between our thoughts and our experiences.

The nervous system is a higher order of consciousness including consideration and contemplation. It developed from the hydra, one of the earlier multi-celled organisms. The hydra has tiny tentacles or cilia which transmit information to the nervous system. It uses this information to migrate by attaching cilia to an object and releasing its foot to stand on its head and then to replace its foot further along the way, subsequently releasing the cilia. This is definitely a slow process. All our special sense receptors: retina, cochlea, etc. have some form of hydra-like cilia to pass on information. These receptors connect to both the sensory and motor divisions of the central nervous system.

There is another set of receptors in the retina, the Muller cells, which send information to the connective tissues.

All fibroblasts connect physically with each other creating another meshwork of communication within the matrix. In this way we could explain the reaction times of baseball hitters and other quick and intuitive responses of the organism. We could also theorize that we are limited by observing with our nervous systems. Instantaneous events are elusive. According to Oschman, the unconscious exists in the matrix; intuition exists in the matrix. Einstein was quoted as saying: “Intuition is a sacred gift and the rational mind is its faithful servant. We have however created a society that worships the servant and has forgotten the gift.”

The workshops on the second day were no less stimulating and groundbreaking. Jeremy Gilbey, the director of the weekend program led the first practical, “tensegrity diagnosis.” The students were led through a screening test of structural functioning, something we all can do with our eyes closed, but this time it was as if we closed our eyes and used the matrix consciousness to establish where the patient’s body was structurally imbalanced. We looked at the body with an eye for the preset tension that tensegrity espouses. We examined it relative to the many fluid compartments and their relationships to each other. We considered organs and their capsules as part of the overall structural picture. We used our whole body to let the information come to us in an allowing manner.

The second practical by Liz Hayden emphasized the connective tissue matrix as the focus for palpation. We palpated the quality and viscosity of the connective tissue matrix. We used the bottom of the patient’s feet and made contact with our thumbs listening to the primary respiratory mechanism. Then switching from person to person we gained a good sense for the variability of different people. While waiting, we observed the change from a more gel state of the connective tissue matrix to a more sol state. We considered the reasons for the varying quality of the tissue viscosity: toxins, allergies, drugs, etc. We visualized the macroscopic to microscopic connectivity of the matrix under our thumbs.

The third practical by Lis Davies and myself referred to the communication ability of the matrix. We reviewed the frequency spectrum and methods for treatment in this context used by Robert Fulford, DO, the "percussion hammer." Lis played her violin to demonstrate dissonance coming into harmony as she tuned the instrument. In the practical we observed the patient's "base note." We then looked for harmonies and dissonances in the system. We looked for altered tensegrity as an influence on the quality of vibration. We explored whether the whole system would come into harmony with the base tone.

The fourth practical by Nicholas Handoll emphasized the individual in relation to the environment. Ordinarily we think of ourselves as space occupying, moving through emptiness around us. Instead, we looked at the individual as space instead

of matter. The space between the material elements and within the atoms of the matter is far greater than the matter itself. The energy residing there in the space is beyond comprehension. We succeeded in seeing the individual as a negative instead of a positive "photograph."

The final practical by Peter Cockhill emphasized the ever-present and unexplainable now. William Sutherland spoke of this concept as he mentioned Intelligence with a capital "I". In the practical we felt the parts all working together in "quantum jazz." All the parts are independent but harmonize to create a voice of the whole. In the now, the mega-organizing happens. We acknowledged the different time durations of different processes in the body. We synchronized with the now and let the question come: from where does potency originate, from within or from without?

With that we had come through an amazing process of looking at the body mechanically, spatially, energetically, and spiritually. We had developed awareness for matrix consciousness as it applies to physiology and healing. This was an enormous osteopathic journey led by explorers of far-seeing intent. I will enjoy revisiting this reality.Δ

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## *Proceedings of the International Research Conference Celebrating the 20<sup>th</sup> Anniversary of the Osteopathic Center for Children*

**Conference Director: Viola M. Frymann, DO, FAAO**  
**Editor: Hollis H. King, DO, PhD, FAAO**

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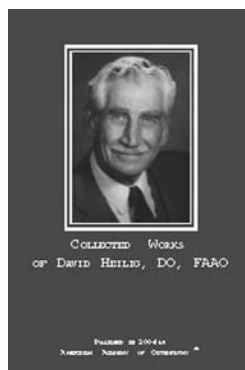
# Book Review

Reviewer: Anthony G. Chila



***Selected Writings of Paul E. Kimberly, DO, FAAO, D.Ost.Ed(Hon.), FCA***  
**Myron C. Beal, DO, FAAO, Editor.**  
**pp. 158. American Academy of Osteopathy®, 2003.**  
**AAO Bookstore: Item No. WPCD04 @ \$34.95 plus S/H**

Doctor Kimberly may well be recalled by many of today's practitioners as the teacher who advocated *Formulating a Prescription for Osteopathic Manipulative Treatment*. In this volume it becomes quickly apparent that he was influential in other expressions of Osteopathic Philosophy, Theory and Methods. Close enough in time to the influence of AT Still (Kimberly's mother entered the Des Moines school in 1925), his writing provides strong, documented support for the founder's theories. For those whose practice includes the concept of Osteopathy in the Cranial Field, Doctor Kimberly was also the individual who taught the anatomy of the cranial structures to support the early courses of William G. Sutherland, DO. As Chairman of the Neurology Department of the Des Moines College, Doctor Kimberly was the organizer of the series of two-weeks seminars which featured Doctor Sutherland. In his (Kimberly) view, the teachings of Doctor Sutherland were designed to improve understanding of osteopathic principles and application of those principles to all areas of the body. Doctor Kimberly noted that Sutherland had the ability to make students conscious of the delicate complexities of the human machine, and that he was able to describe and demonstrate methods of handling this complex mechanism under any conditions of patient health. Doctor Kimberly served as a member of AAO Teaching Teams (1968-1973), Stuenenburg Professor and Chairman, Department of Osteopathic Theory and Methods, Kirksville College of Osteopathic Medicine (1974-1980) and as Lecturer and Chair, multiple postgraduate tutorials, Michigan State University College of Osteopathic Medicine. In these capacities he faithfully served the mission of the American Academy of Osteopathy®.



***Collected Works of David Heilig, DO, FAAO***  
**Charlotte H. Greene, PhD, Editor**  
**pp. 272. American Academy of Osteopathy®, 2004.**  
**AAO Bookstore: Item No. WP0145 @ \$39.95 plus S/H**

Doctor Heilig was a long-time member of the faculty of the Philadelphia College of Osteopathic Medicine. In this capacity, he authored many publications which reflected his observations on the osteopathic profession's philosophy. In addition, a great number of concise teaching guides were directed toward technical facilitation, valuable to students and to practitioners. *Why Specific Osteopathy?* (1951) is one example for thoughtful review by today's practitioners. In this essay, one is reminded that Osteopathy provides a picture of dynamic processes occurring in patients. The use of osteopathic methods must find an individual pattern. Treatment is determined by the requirements of the individual. Complete management of the patient should be planned as far as possible, and as carefully as the individual treatment. Using this reasoning, the effective osteopathic practitioner will practice in an objective and scientific manner. *Osteopathways: Tips on Technique; Easy Hyperextension* (1988) is an example of conciseness. General rib elevation and hyperextension in the thoracic area is illustrated. Potential for specificity can be increased by careful positioning. Reminders to keep the patient's hands clasped low behind the neck while the physician's arms are held close together minimize leverage on the shoulders. Synchronization of hyperextension with respiratory exhalation facilitate this technique.

Doctor Heilig worked long and faithfully in supporting the mission of the American Academy of Osteopathy®. He cautioned that *Osteopathic Manipulative Medicine* must be more than merely a method. Within this thought, he recognized that residency, fellowships and certification tend to create a specialty. He indicated that this should not be a concern because of the necessity to maintain leaders and teachers of osteopathic principles and methods.

The students and practitioners who were privileged to encounter and learn from these exemplary teachers stand today in great debt to their fidelity to the osteopathic concept. Repayment can come from renewal through review of their writings as represented in these volumes.



***Proceedings of the International Research Conference Celebrating the 20th Anniversary of the Osteopathic Center for Children: February 6-10, 2002; San Diego, California***

**Hollis H. King, DO, PhD, FAAO, Editor for the Academy.**

**pp. 106. American Academy of Osteopathy®, 2005.**

**AAO Bookstore: Item No. WP0150 @ \$30.00 plus S/H**

This four-days Conference was directed by Viola M. Frymann, DO, FAAO, FCA. International in presentation (United States, France, Latvia, Russia), the event achieved another landmark in the remarkable career of Doctor Frymann. The outline of each day and the material presented provide an indication of the depth of the material presented:

**Day One:** Chaired by Albert F. Kelso, PhD. Topics presented included:

*Benefits of Osteopathic Health Care for Children* (Kelso)

*A Modern Conceptualization of the Functioning of the Primary Respiratory Mechanism*

(Moskalenko, Frymann, Kravchenko, Weinstein)

*Influence of the Venous Sinus Technique on Cranial Hemodynamics* (Huard)

**Day Two:** Chaired by Melicien A. Tettambel, DO, FAAO. Topics presented included:

*Dr. Viola Frymann's Journey in Osteopathic Practice* (Tettambel)

*The Cranial Rhythmic Impulse and the Traube-Herring-Meyer Oscillation* (Nelson, Sergueff, Glonek)

*Applications of the Osteopathic Approach to Schoolchildren with Delayed Psychic Development of Cerebral-Organic Origin*

(Lassovetskaia)

**Day Three:** Chaired by Raymond J. Hruby, DO, FAAO. Topics presented included:

*Awakening Research in Osteopathic Practice: Overcoming the Tomato Effect* (Hruby)

*Bone-Tissue Conductivity of High-Frequency Acoustic Oscillations in the Cranial Structures of Human Beings Under the Influence of Various Osteopathic Techniques as a Method of Objective Estimation of Osteopathic Procedures Efficiency*

(Vartanyan and Kuznetsova)

*Influence of the Osteopathic Cranial Treatment On the Human Gravitational Posture* (Caporossi)

**Day Four:** Chaired by Michael M. Patterson, PhD. Topics presented included:

*Toward a Philosophy of Osteopathic Research* (Patterson)

*The Osteopathic Approach to the Child with a Seizure Disorder* (Frymann)

*Response of the Myocardium to Osteopathic Manipulation in the Cardiac Area Monitored by Simultaneous EKG Recording*

(LeHougre and Jurak)

*Observations From Normal Newborn Osteopathic Evaluations* (Allen)

The papers presented during this Conference bear critical reading from students and practitioners alike. The study proposals and analytic methodologies indicate the precision with which the investigators have approached their study of the osteopathic cranial concept. Rational, objective statement of observations and conclusions strengthens the contribution of this volume to research literature.

The appearance of this volume, three years after the event, parallels publication habits of several institutions and foundations. As noted by the Editor (King), the start of future research projects can be discerned, as some of the authors have already evidenced continuation of their work as published here.

This volume is a testament to the legacy of William Garner Sutherland, DO. From his self-assessment of "having only drawn aside a curtain" through the tireless effort and dedication of Viola M. Frymann, the osteopathic cranial concept has moved into international acceptance of efficacy of method and value for research. The demonstrations represented herein are certainly indicative of appreciation and utilization of the expanding osteopathic concept.

# Elsewhere in Print

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## ***Rheumatoid Arthritis: Clues to Early Diagnosis***

Eugene Mochan, DO, PhD

Philadelphia College of Osteopathic Medicine

Reprinted with permission from *Consultant*: Volume 45. Number 5. April 15, 2005

### **ABSTRACT:**

With the advent of disease-modifying anti-rheumatic drugs (DMARDs), which can prevent the joint destruction that occurs in rheumatoid arthritis (RA), early diagnosis of this progressive systemic disease has become crucial. Signs that may predate the onset of joint symptoms in RA include fatigue, weakness, depression, and unexplained weight loss. The early stage of RA is characterized by subtle joint changes and the absence of laboratory and radiographic markers of the disease. In moderate RA, patients frequently have diffuse swelling and limited joint mobility without joint deformities; acute phase markers and rheumatoid factor are present, as are radiographic findings that can include periarticular osteopenia and minor cartilage destruction. Advanced RA is marked by severe cartilage and bone destruction and joint deformity. A key feature of the disease is very early activation of joint-destroying mechanisms. Suspect RA if a patient presents with persistent swelling of 3 or more joints; metatarsophalangeal, metacarpophalangeal, and proximal interphalangeal involvement; and/or morning stiffness that lasts 30 minutes or more. Collaboration between the primary care physician and the rheumatologist is crucial for a favorable long-term outcome.

## ***Monosodium Urate Deposition Arthropathy (Part II):***

### ***Treatment and Long-term Management of Patients with Gout***

Robert L. Wortmann, MD; The University of Oklahoma College of Medicine; Tulsa, OK

H. Ralph Schumacher, Jr., MD; University of Pennsylvania School of Medicine; Philadelphia, PA

Johns Hopkins University School of Medicine Advanced Studies in Medicine

Reprinted with permission from *Adv. Stud. Med.* 2005. Volume 5. Number 4. pp. 183-194.

### **ABSTRACT:**

**Purpose:** To review recent findings on the acute and chronic treatment of patients with gout.

**Epidemiology:** Gout is an established consequence of hyperuricemia and affects an estimated 5 million Americans. The incidence of gout increases as serum urate levels increase.

**Review Summary:** In Part I of this series, the prevalence of hyperuricemia, its diagnosis, and natural history of gout were reviewed. Part II of this series focuses on the acute and long-term management of patients with hyperuricemia and gout. The pharmacologic management of asymptomatic patients who are found to be hyperuricemic is controversial, although lifestyle changes and careful assessment of factors that may predispose patients to hyperuricemia and/or gout should be undertaken.

**Type Of Available Evidence:** Randomized-control trials, unstructured review, textbook, retrospective cohort studies.

**Grade Of Available Evidence:** Fair.

**Conclusion:** The management of hyperuricemia and gout includes treating the acute attack, preventing attack recurrence, reducing the total body urate pool, and addressing comorbid conditions. Acute attack treatment often involves adjunctive physical measures and pharmacologic management. The choice of pharmacologic agent is based upon numerous factors (eg, the number of joints involved, the duration of the attack, the patient's comorbidities, and the administration options). Urate-lowering maintenance therapy is needed for those who experience recurrent gout attacks or who have tophi. Uricosurics or allopurinol should be used, targeting a serum urate of <6mg/dL. Several urate-lowering agents with traditional as well as novel mechanisms of action are in clinical trials and may offer the promise of improved management of this chronic and often disabling condition.

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