

THE AAO

FORUM FOR OSTEOPATHIC THOUGHT

JOURNAL

 Official Publication of the American Academy of Osteopathy®

TRADITION SHAPES THE FUTURE

VOLUME 17 NUMBER 2 JUNE 2007



Neuromusculoskeletal Causes of Back Pain in Competitive Figure Skaters

page 13

Instructions to Authors

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

The AAO Journal welcomes contributions in the following categories:

Original Contributions

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

Case Reports

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

Clinical Practice

Articles about practical applications for general practitioners or specialists.

Special Communications

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

Letters to the Editor

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

Book Reviews

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

Note

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

Submission

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

Editorial Review

Papers submitted to *The AAO Journal* may be submitted for review by the Editorial Board. Notification of acceptance or rejection usually is given within three months after receipt of the paper; publication follows as soon as possible thereafter, depending upon the backlog of papers. Some papers may be rejected because of duplication of subject matter or the need to establish priorities on the use of limited space.

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1. Type all text, references and tabular material using upper and lower case, double-spaced with one-inch margins. Number all pages consecutively.
2. Submit original plus three copies. Retain one copy for your files.
3. Check that all references, tables and figures are cited in the text and in numerical order.
4. Include a cover letter that gives the author's full name and address, telephone number, institution from which work initiated and academic title or position.
5. Manuscripts must be published with the correct name(s) of the author(s). No manuscripts will be published anonymously, or under pseudonyms or pen names.
6. For human or animal experimental investigations, include proof that the project was approved by an appropriate institutional review board, or when no such board is in place, that the manner in which informed consent was obtained from human subjects.
7. Describe the basic study design; define all statistical methods used; list measurement instruments, methods, and tools used for independent and dependent variables.
8. In the "Materials and Methods" section, identify all interventions that are used which do not comply with approved or standard usage.

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We encourage and welcome a CD-ROM containing the material submitted in hard copy form. Though we prefer receiving materials saved in rich text format on a CD-ROM, materials submitted in paper format are acceptable.

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

Illustrations

1. Be sure that illustrations submitted are clearly labeled.
2. Photos and illustrations should be submitted as a 5" x 7" glossy black and white print with high contrast. On the back of each photo, clearly indicate the top of the photo. If photos or illustrations are electronically scanned, they must be scanned in 300 or higher dpi and saved in .jpg format.

3. Include a caption for each figure.

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References

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

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THE AAO JOURNAL

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THE AAO FORUM FOR OSTEOPATHIC THOUGHT
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TRADITION SHAPES THE FUTURE • VOLUME 17 NUMBER 2 JUNE 2007

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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NeuroMusculoskeletal Medicine and Osteopathic Manipulative Medicine Plus One Residency Positions at LECOM

Lake Erie College of Osteopathic Medicine has openings in its NMM/OMM plus one residency program for matriculation in July 2007 and December of 2007. Application is open to osteopathic physicians who will have completed a residency in another specialty who wish to become board certified in neuromusculoskeletal medicine and osteopathic manipulative medicine. The one year residency includes self directed and supervised study in inpatient and outpatient manipulative medicine; as well as experience in the training of medical students, interns, residents and other physicians in the skill of osteopathic manipulation.

Candidates will participate in ground-breaking osteopathic research as part of the program. Please respond with a letter of inquiry and CV to: NMM/OMM Fellowship c/o LECOMT 1858 West Grandview Boulevard, Erie, Pennsylvania 16509.

Questions and informal inquires should be directed to the residency director – John E. Balmer, D.O. at JohnBalmer@aol.com or 814-654-7334 ext 310.



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Letter to the Editor

Jerry Dickey, DO, FAAO and Heather Morris OMS-IV wrote an excellent and interesting article “Managing Peptic Ulcer Disease Utilizing Osteopathic Manipulation” in the March 2007 Issue of the AAO Journal.

Many years ago before the introduction of present day pharmaceuticals, I managed a great many cases of Peptic Ulcer Disease very successfully with osteopathic manipulation and “Stress Management”. As was the custom for years, little change was made in the patient’s diet except making sure the diet was nutritious and that the individual ate frequently and abundantly. Too often our thoughts are about prescribing the latest pharmaceutical rather than learning about the patient’s neuromuscular skeletal system (especially in the area of the thoracic spine) and what we can accomplish with osteopathic manipulative treatment.

In my opinion, gastric ulcers develop as a consequence of an acute or chronic stress situation in the individual, resulting in a somatic dysfunction involving the thoracic area of the spine particularly in the area of T- 6 through 1-9. This somatic dysfunction results in an overstimulation of the sympathetic nervous system, which in turns causes a reduction in the blood supply to the stomach in the area where the ulcer develops. A. T. Still D.O. would say “The Rule of the Artery is Supreme”. That is just as true today as it was in the 1870s.

Let us ask ourselves the question, “Why does an acute gastric ulcer occur in the stomach which produces very strong acid which supposedly causes the ulcer”? If you say it is due to the H. Pylon bacterium, why aren’t there multiple ulcers in the stomach instead of a single ulcer, which is usually the case? If the H. Pylon is present in the Acute Ulcer, I feel that it arrived after the ulcer area was compromised poor circulation brought about by the over-stimulation of the sympathetic nervous system. Any living tissue devoid of adequate blood supply will be subject to pathological change no matter where it is located.

When an individual is under acute or chronic stress, the area of the thoracic spine becomes involved more than any other area of the body because the stress has a profound affect on the sympathetic nervous system via the sympathetic chain ganglia, which controls the circulation to the heart, the great vessels and the abdominal viscera.

When physicians think osteopathically first, answers sometimes are very simple.

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View from the Pyramids

Anthony G. Chila

The Next Chapter

In the March 2007 issue of the *American Academy of Osteopathy JOURNAL (AAOJ)*, I summarized my tenure as Editor-in-Chief. Since that time, appropriate steps have been taken for continuation of responsibilities connected with this publication. The AAO Board of Trustees made the decision to appoint an interim Editor-in-Chief for the duration of my uncompleted term (September 2007-December 2008). The appointee is Robert C. Clark, DO. During the interim period, the Board of Trustees and Dr. Clark will be exploring further expectations and goals for the improvement of this organization's official publication. I have known Dr. Clark for many years, and am sure that he will provide critical insight for this activity. I sought to address this concern in the following remarks:

"As the page turns, all of us who are involved in the func-

tions of the American Academy of Osteopathy will, hopefully, continue to be supportive of this vehicle of communication. In a time when publications are experiencing great competitive and financial demands, defining and sustaining a publication becomes a matter of great organizational priority."¹

In the sense of the remarks, I am appreciative of the learning curve provided for me during my tenure. I am confident that this foundation will serve well in my new assignment as Executive Editor, *Foundations for Osteopathic Medicine, 3rd Edition*. I have been privileged to serve the American Academy of Osteopathy for many years in many capacities, and will continue to do so. This is not to say goodbye. Instead, it is to accept the challenge of another *Forum for Osteopathic Thought*.

1. *The AAO JOURNAL*. Volume 17. Number 1. March 2007. p 5

American Academy of Osteopathy® Calendar of Events

July 13-15

The Golden Opportunity: Three Masters of Osteopathy in the Cranial Field
CCOM, Chicago, IL
Stephanie Waecker, DO, Program Chair

August 17-19, 2007

New information on the Still Technique: A Rediscovered Technique of A.T. Still, MD
OSUCOM, Tulsa, OK
Richard L. VanBuskirk, DO, FAAO, Program Chair

September 7-9

Beyond Facilitated Positional Release
LECOM/FL, Bradenton, FL
Stan Schiowitz, DO, FAAO, Program Chair

September 29

One-day course: *OMT without an OMT Table*
San Diego Marriott
San Diego, CA
Ann L. Habenicht, DO, FAAO, Program Chair

September 30 – October 4

AOA Convention: AAO program: Adjuncts to OMT in the Treatment of Chronic Pain
San Diego Convention Center
San Diego, CA
John E. Balmer, DO, Program Chair

October 19-21

Beyond Facilitated Positional Release
COMP/CA, Pomona, CA
Stan Schiowitz, DO, FAAO, Program Chair

November 1-3

Prolotherapy Weekend for ALL Levels and Experience
UNECOM, Biddeford, ME
Mark S. Cantieri, DO, FAAO, Program Chair

November 9-11

Beyond Facilitated Positional Release
DMUCOM/IA, Des Moines, IA
Stan Schiowitz, DO, FAAO, Program Chair

December 1-3

Osteopathic Approaches in Gastroenterology: The Hind Gut
Holiday Inn Golden Gate
San Francisco, CA
Kenneth Lossing, DO, Program Chair

Contributors

Stephen I. Goldman and Mitch Moyer. Neuromusculoskeletal Causes Of Back Pain In Competitive Figure Skaters. This Scientific Paper/Thesis was submitted in partial fulfillment of requirements for Fellowship in the American Academy of Osteopathy. The first author (Stephen I. Goldman) was conferred status as Fellow in 2005. This paper is a collaborative effort involving the osteopathic perspective of Goldman and the coaching perspective of the second author (Mitch Moyer). Moyer's work with the Detroit Skating Club carries international recognition. The authors document dramatic increase in back pain complaints among higher competitive levels of both freestyle and pairs figure skating. Of significance in this paper is the recognition of repetitive overuse due to consistently rotating, jumping and falling in one direction. Patterns are described and the implementation of osteopathic manipulative management is discussed. (p. 13).

Brett P. Thomas. Alleviating Atypical Tender Points Through The Use Of Myofascial Release Of Scar Tissue. This Scientific Paper/Thesis was submitted in partial fulfillment of requirements for Fellowship in the American Academy of Osteopathy. The author was conferred status as Fellow in 2005. A significant elaboration of treatment of scar tissue restriction is developed from observation of response to treatment of atypical ("Maverick") tender points. In the traditional Jones model of treatment, no explanation of atypical tender points is provided. The author develops a rationale for altering the character of atypical tender points through treatment of scar tissue found to be remote from the location of the atypical point. This demonstrates evolution of thought in the use of the fundamental diagnostic and treatment considerations of the Jones model. (p. 19).

Anjali Kumar, Scott T. Stoll and Kendi L. Hensel. Ehlers Danlos Syndrome: A Case Report. The authors review the nomenclature history of the "Elastic Man" Syndrome to its contemporary name. Primarily diagnosed clinically, this syndrome is associated with defective synthesis or structure of collagen. Common features include skin hyperextensibility, joint hypermobility and tissue fragility. Sub-classification is also utilized. Incidence is estimated at 1:5000, without racial or ethnic predisposition. A significant treatment challenge is posed, because there is no known cure for this condition. Consideration is given to a role for osteopathic philosophy, manipulation, and interdisciplinary management. (p. 26).

Regular Features

FROM THE ARCHIVES. *Osteopathic Literature* is the focus of this extensive selection of archival pages. At a time when editorial leadership of the *American Academy of Osteopathy JOURNAL (AAOJ)* is changing, an overview of past osteopathic publications seems to be in order. There are many readers of the *AAOJ* and osteopathic practitioners in general, who may have experienced frustration about the relative paucity of osteopathic texts. Dr. Booth's review in the archival pages indicates that a very extensive literature base for the osteopathic profession existed in the form of books, periodicals, and circulars. This selection offers quality historical review as well as commentary on many publications of the time. Moving to the present, *Foundations for Osteopathic Medicine (FOM)* is scheduled for publication of the 3rd edition in October 2009. Members of the osteopathic profession should be aware that, in addition to *Foundations*, the publisher, *Lippincott Williams & Wilkins* is very actively engaged in the production and publication of many other texts authored by osteopathic physicians and students. The amount of space devoted to this column precludes inclusion of another column, *Dig On*, in this issue. The topic of osteopathic literature, however, can easily be seen to overlap. (p. 7).

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. 18).

BOOK REVIEW. *Healer's Touch* (Jan T. Hendryx) describes one osteopathic physician's transformational journey. Among the explorations reported: How touch uncovers clues about illness; promotion of healing through the use of the hands; interactions of body, mind, and spirit in health and healing. This volume offers much more and is very engaging to read. *NeuroFascial Release Course Videos and DVD's* (Stephen M. Davidson). This series of very thoughtfully prepared materials is the result of many years of teaching. The assembly of materials, and the format of lecture and practical considerations is easy to follow. The use of anatomical models and illustrations is well done. The experienced practitioner can easily use these materials both to understand *NeuroFascial Release* and to refresh basic concepts of osteopathic manipulative practice. (p. 30).

ELSEWHERE IN PRINT. In this survey, readers can learn about: New paths in Stem Cell Research (*Putting Potency Before Politics*); Primary Care management of a common encounter (*Diabetic Foot Problems: Keys to Effective Prevention*); Postural variables differentiations between Saudi and European subjects (*Head Posture and Malocclusion in Saudi Subjects*). (p. 31).

From the Archives

Books

“History of Osteopathy and Twentieth-Century Medical Practice”, E. R. Booth, 1905 and 1924, pgs. 282-293

A number of books which deserve attention have appeared, but no attempt will be made to review them or to give them the consideration they deserve. The first writings upon the subject of Osteopathy, most of which appeared first in the *Journal of Osteopathy*, are those by Dr. Still himself. To every osteopath they are of inestimable value. They constitute, as Dr. Hardin has said, the osteopathic bible. Like the Christian Bible, they are often misunderstood and misinterpreted by those whose minds have not been cleansed by the common sense of osteopathic doctrine, and like the same good book, many a wise thought has proved a stumbling block to some whose hearts are right, but whose visions are limited. The writer remembers the interest with which he read the *Autobiography of A. T. Still* before he began the study of osteopathy; but he remembers the immeasurably greater interest with which he read it after spending two years in almost daily communion with its author, and even more time in hard work trying to grasp the full significance of osteopathy. *The Philosophy of Osteopathy*, *The Philosophy and Mechanical Principles of Osteopathy*, and the many articles from the pen of Dr. Still that have appeared in the journals, particularly the *Journal of Osteopathy*, may be spoken of in the same strain. Future generations will be better able to see the breadth of his science and the depth of his philosophy than the present generation. Our perspective is too narrow.

In 1898, Dr. C. P. McConnell had a limited edition of *Notes on Osteopathic Therapeutics* printed. It comprised the substance of a series of lectures delivered to the advanced classes in the American School of Osteopathy, and was used as a textbook by subsequent classes. Later, the same author's *Practice of Osteopathy* appeared and was soon recognized as the first textbook to cover the general field of osteopathic practice, as the larger works

on the practice of medicine cover the general field of medical practice. In arrangement, it is based upon Dr. William Osler's well-known *Practice of Medicine*, but is thoroughly osteopathic in its therapeutics.

The subject from a general, yet practical, standpoint, has been ably presented by Dr. Charles Hazzard in his *Principles of Osteopathy*, which consists of a series of lectures delivered before the students of the American School of Osteopathy. This work deals with the facts of anatomy and physiology that apply to the practice of osteopathy, rather than with the basic principles underlying the science. The second edition contained lectures upon a limited number of diseases with the osteopathic methods of diagnosis and treatment of the same. It is, therefore, a suitable introduction for the use of the student in his practical work. This was followed by a more pretentious work entitled the *Practice of Osteopathy*, which covers nearly the same field covered in his former work, with much, in addition, thereto relating to the examination, osteopathic diagnosis, cause of each disease, treatment, and results as shown by a large number of carefully classified case reports.

Dr. Dain L. Tasker, in his *Principles of Osteopathy*, has given us much that is of value to every student of the subject. His recognition of the importance of the cell, the nature of the different kinds of tissues, etc., and the unmistakable scientific basis upon which he rests his conclusions are worthy of special commendation. The work also discusses the subject of examination of the different regions of the body and the treatment of abnormalities. The writer is of the opinion that Dr. Tasker's book would have been more acceptable to the profession and fully as valuable to the laity had all cuts representing movements been left out. They seem to be valueless to the trained

osteopath and misleading to one not so trained, from the fact that a movement can not be adequately represented by cuts; and the conditions of the tissues, which cannot be illustrated at all, must be known to the operator before he can give a rational treatment.

Dr. W. L. Riggs, deceased, was the author of two succinct little manuals. The first was called the *Theory of Osteopathy*, and the second, *A Manual of Osteopathic Manipulations and Treatment*. These books were not intended for the general public. They contain much that is valuable to the conscientious student of osteopathy, and many practical suggestions that can be utilized by graduate osteopaths. The same criticism made against the cuts in Dr. Tasker's book, will apply to Dr. Riggs's second volume.

A more recent book upon the general subject is by Dr. Guy D. Hulett, deceased, on the *Principles of Osteopathy*. He has discussed at length theories and practices in search of fundamental basic principles, and has presented them in the light of practical experiences. His conclusions are more nearly in accord with those enunciated by the founder of osteopathy 30 years ago than are those of any other writer. The distinction between osteopathy and other methods of treating disease is made clear and the doctrine of the correction of lesions in practice as the only real curative procedure, is in marked contrast with the practice of all other methods using manipulation as well as that of osteopaths who lay stress upon stimulation or inhibition. A second edition, enlarged to 373 pages, and improved by the addition of new materials and better cuts, appeared in July, 1904.

Dr. Marion E. Clark is the author of a book on *Diseases of Women*, a manual of gynecology designed for the use of osteopathic students and practitioners. This was the first attempt to put in book form

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a systematic explanation of the subject as taught and practiced by osteopathy. A second edition appeared in September, 1904, very much enlarged and improved. It contains 539 pages, is printed from new plates, is more profusely illustrated, and more substantially bound.

The same subject has been ably presented by Percy H. Woodall, MD, DO, in a book entitled, *Osteopathic Gynecology*. Both have been highly commended by the profession. They are used as textbooks in osteopathic colleges as well as by members of the profession engaged in practice.

Physiology, Exhaustive and Practical, by Dr. J. M. Littlejohn, appeared in 1898. It is an elaborate work of 832 pages and contains the lectures delivered upon the subject at the American School of Osteopathy.

Several books prepared by professors in osteopathic colleges that are important in teaching the general science of osteopathy but that do not deal with the subject specifically, have appeared from time to time. Among these may be mentioned Dr. C. W. Proctor's *Brief Course in General Chemistry* and *Brief Course in Physiological Chemistry*. Other works, which it has not been the author's privilege to examine, deserve attention.

Dr. F. P. Young's *Surgery* from an osteopathic standpoint, Dr. C. E. Still, collaborator, appeared in June, 1904. It has 438 pages, with 156 illustrations. The effect of osteopathy in revolutionizing modern surgery is evident from a perusal of the work. It does not detail operative methods as these properly belong to operative surgery. Special attention is given to the purely osteopathic treatment in preventing operations and as practical aids before and after operations.

Dr. William R. Laughlin's *Anatomy in a Nutshell*, a treatise on human anatomy in its relation to osteopathy, appeared in March, 1905. It is in one volume of 616 pages, illustrated by 290 excellent plates. The book is not intended to take the place of the standard texts on anatomy. As it is designed especially for the student in descriptive, anatomy engaged in classroom work it is divided into 200 lessons so as to enable the learner to concentrate his attention upon certain definite lines of study each day, with a view to future practice.

Several books designed to present osteopathy in light vein, to the general reader, have appeared. Those that have attracted most attention are *Crutches for Sale* and *Confessions of an M. D.*, the latter by Dr. E. D. Barber. The former was published in 1898. The good work of an osteopathic physician in case of an accident to a young lady is the center about which the plot clusters. The latter comprises a series of letters from a supposed drug doctor to his son. The father by degrees became interested in osteopathy, and finally turned his large practice over to his son who had graduated in the science.

Periodicals

A large number of osteopathic periodicals have appeared from time to time. Some of them were short lived; others have improved with age and grown in favor. Some were only intended to "boom" the business of those interested in them and were suspended as soon as they had succeeded sufficiently or failed entirely to accomplish that end. Others were the organs of schools and their life was generally synchronous with that of the schools which they represented. Still others had no affiliation with any school or private practitioner but represented the cause of osteopathy as seen by those who were responsible for them. The character of literature distributed became a question of concern to the profession at large, and the Board of Trustees of the American Osteopathic Association offered the following timely suggestions in its report at the meeting in 1901:

"The board feels justified in calling attention to the mediocre character of much osteopathic literature, and perhaps sounding a note of warning as to the effect of even the best 'popular' kind. In our attempts to popularize osteopathy, is there not great danger of lowering the plane of thought along which the consideration of osteopathy shall be directed? Our assertion that its foundations in science are deep and broad avails nothing if our elaboration of it is shallow. It is mistaken kindness which reacts by degrading the object upon which it is bestowed."

The Journal of Osteopathy was the first regular publication in the interest

of the new science. It has always been published by the American School of Osteopathy at Kirksville, Missouri. Its purpose was to disseminate a knowledge of osteopathy for the information of the people and to supply the needs of a school journal. Dr. Still has been one of its principal contributors and many of his best thoughts have been given to the profession and to the public through its columns. The first issue appeared in May, 1894, and it has been published regularly every month since, except for September, 1897. Its editors have been Dr. Nettie H. Bolles, May, 1894, to January, 1895; Dr. Blanche Still (now Mrs. Geo. M. Laughlin), January, 1895, to May, 1897; Col. A. L. Conger and Dr. William Potter, May, 1897, to April, 1898; William Gill, April, 1898, to January, 1899; Dr. H. S. Bunting, January, 1899, to July, 1899; Dr. Minnie Dawson, July, 1899, to March, 1900; and Dr. Geo. M. Laughlin, March, 1900, to the present time. The first three volumes were published in quarto form with four pages, but most of the time with eight. Since May, 1897, it has been an octavo journal, in appearance very much as it is at present.

The *Osteopath* has been published as the organ of the Pacific School of Osteopathy most of the time since the organization of the school. Part of the time it has appeared monthly, but lately it has been issued quarterly. It has contained many original articles of great scientific value, some of which have been illustrated by cuts of original work done in the college. Most of the contributors have been members of the faculty.

The *Northern Osteopath*, a monthly magazine, was issued by the Northern Institute of Osteopathy, Minneapolis, Minnesota, from July, 1896, to March, 1902, when it was consolidated with the *Cosmopolitan Osteopath*, and became the *Northern Osteopath* and *Cosmopolitan Osteopath*, under the management of W. R. Dobbyn, Minneapolis, with Dr. J. A. Still, editor-in-chief.

The *Wisconsin Osteopath* was issued in the interests of the Milwaukee Institute of Osteopathy, and the *Kansas City Osteopathic Magazine* by the Kansas City school during most of the periods covered by the lives of those schools.

The first number of the *Boston Osteopath* was published in January, 1898.

It was issued monthly till October, 1903. It was the official organ of the Boston Institute of Osteopathy and had no inconsiderable influence in the promulgation of osteopathy in the New England States. It was under the editorial management of Dr. C. E. Achorn and Julia C. Clarke.

The *Massachusetts Journal of Osteopathy* is the natural successor of the *Boston Osteopath*, although it was issued before the latter suspended. It entered upon its career as the representative of the Massachusetts College of Osteopathy, and in the interest of osteopathy and osteopathic education, especially in the New England States, in April, 1902. It is a bi-monthly publication, under the management of R. K. Smith. Most of its contributors are members of the directory of the college.

The first issue of the *Cosmopolitan Osteopath* appeared in August, 1898, with Col. A. L. Conger as editor and Professor W. L. Riggs as associate editor. This was the announcement number of the S. S. Still College and Infirmary of Osteopathy, Des Moines, Iowa. Col. Conger remained editor until his death in 1899, when he was succeeded by Dr. A. Still Craig, who served in that capacity till September, 1900, when Dr. J. A. Still became editor. In March, 1902, the *Cosmopolitan Osteopath* was consolidated with the *Northern Osteopath* under the title, the *Northern Osteopath* and *Cosmopolitan Osteopath*, when William R. Dobbyn became managing editor with Dr. J. A. Still continuing as editor-in-chief. In April 1903, its publication at Des Moines, was resumed under its old name, with Dr. J. A. Still as editor-in-chief. It has always appeared in neat magazine form and maintained a high standard of literary and professional excellence.

The *California Osteopath* was issued by the California College of Osteopathy in the interest of the college and for the advancement of the science of osteopathy. The first issue appeared in September, 1898, and the last issue appeared early in 1900. Dr. Alden H. Potter was its only editor.

The *Southern Journal of Osteopathy* was started soon after the establishment of the Southern School of Osteopathy. It is a monthly journal published in the interests of the science of Osteopathy and as the organ of the school. Its first editor was Dr. G. F. Nason, who was succeeded in

October, 1901, by Dr. R. S. Collier. He served one year, when Dr. W. S. McClain, the present editor, assumed control.

The *Philadelphia Journal of Osteopathy* was issued as a monthly publication from January, 1899, to January, 1904. It is now published quarterly. It has always been the official organ of the Philadelphia College of Osteopathy, and has also been valuable in the dissemination of a knowledge of osteopathy, especially in the eastern states. Dr. Mason W. Pressly was its editor, assisted by the faculty of the college, until his retirement from the college.

The first osteopathic journal issued independent of any school was the *Popular Osteopath*. Volume I, Number 1, appeared in January, 1899. It was conducted in the general interest of the profession. Its chief mission originally was to explain osteopathy to the people and correct many of the erroneous ideas concerning the science that had crept into the public mind. It was first published at Kirksville, Missouri, with Dr. W. F. Link, editor, and Drs. M. C. Hardin, A. L. Evans, Charles Owens, and Charles Hazzard, associate editors. In May, 1899, its publication office was moved to Chattanooga, Tennessee. As the national organization, the American Association for the Advancement of Osteopathy, had no journal representing its interests, the *Popular Osteopath* was adopted as the official organ of the association before the first issue appeared. This action was renewed at the meeting of the association at Indianapolis, Indiana in July, 1899, and arrangements were made for printing a directory of the members of the association. The first issue contained a cut of the officers of the association, and the first official directory appeared in the October, 1899 issue. It had 566 names with the address of each and the name of the school from which each graduated. The directory was a feature of each issue until its publication was suspended in June, 1900.

The *American Osteopath* was first published at Kirksville, Missouri, and later at Memphis, Tennessee. It was issued as a quarterly publication for the profession, a monthly publication for the public, and then later as a weekly publication, but appeared at irregular periods during its existence from 1899 to 1901.

It published the complete proceedings of the meeting of the American Osteopathic Association at Indianapolis in July, 1899, a directory of osteopaths, and other valuable information.

Bulletin Number 1, of the Atlas Club, Kirksville, Missouri appeared in December, 1899. It contained merely the names and addresses of the members. Three or four issues were published within a little more than a year. In March, 1901, Volume I, Number 1 of the *Bulletin*, published by the Atlas and Axis Clubs, came out and it has been a regular monthly visitor, except in July and August, to the members of those clubs ever since. The *Bulletin* is a fraternal journal, but has contained many articles of prime importance to the profession at large. It is edited by students of the American School of Osteopathy.

Osteopathic Success was the name of the organ of the Atlantic School of Osteopathy from its first issue in February, 1901. It was published monthly with Dr. J. W. Banning as editor, until September, 1903, when its name was changed to the *Atlantic Osteopath*, a bi-monthly publication with the faculty of the school as editors.

The *Journal of the Science of Osteopathy* was a bi-monthly magazine devoted to the demonstration and exposition of the principles of osteopathy and surgery. The first number appeared in April, 1900, and the last in January, 1903 at which time it was consolidated with the *Osteopathic World*. Dr. J. M. Littlejohn was its editor and it was published in Chicago. It was the highest type of scientific osteopathic literature and attracted the attention of other branches of the medical profession and of scientists both in this country and Europe. Its review of many articles that appeared in the leading medical journals was a noteworthy feature.

In January, 1903, the *Northern and Cosmopolitan Osteopath* and the *Journal of the Science of Osteopathy* were consolidated and christened the *Osteopathic World*. William R. Dobbyn and Sons became the owners and publishers, and Dr. J. Martin Littlejohn, editor-in-chief. It has maintained the qualities of the journals of which it was the outgrowth. Not being under the auspices of any college, it has shown breadth and independence not always present in some of the journals issued for a specific purpose.

→

The *Journal of the American Osteopathic Association* was decided upon at the meeting of the American Osteopathic Association at Kirksville, Missouri in July, 1901. The first number appeared in September, 1901. It was published bi-monthly the first year; monthly since then. It is the official organ of the American Osteopathic Association and the profession. The proceedings of the association have been published in it each year; other papers pertaining to osteopathy, news items, etc., have been prominent features. Dr. A. L. Evans has been the editor-in-chief from the first number, and it has been published in Chattanooga, Tennessee. It has gradually grown in size and excellence, until it now ranks among the best scientific and professional journals.

The *Osteopathic Physician* was launched upon the sea of osteopathic literature in October, 1901. The editor, Dr. H. S. Bunting, was formerly connected with the daily press of St. Louis, Missouri and Chicago, Illinois and had edited the *Journal of Osteopathy*. Its mission at first was that of "a popular journal to aid those who, having health, wish to keep it, and others, having lost health, would regain it." Later, Dr. Bunting conceived the idea of issuing a monthly publication which should be devoted to professional news, the columns of which should also be open to discussion of all topics of interest to the profession. The *Osteopathic Physician* has, since March, 1902, confined its attention to this phase of the work. Dr. Bunting laid a proposition before the trustees of the American Osteopathic Association at Milwaukee, Wisconsin in August, 1902, to make the *Osteopathic Physician* the "official bulletin" of the association. His proposition was accepted and the mutual agreement carried out until December, 1903, when Dr. Bunting tendered the trustees of the American Osteopathic Association the resignation of the *Osteopathic Physician* as the official bulletin, which was accepted. This action grew out of a controversy between Dr. Bunting and Dr. Hildreth relating to the contest for the recognition of osteopathy in Alabama. The paper has been issued in Chicago regularly each month, most of the time as a three-column quarto, with four to 16 pages.

Osteopathic Health, formerly the *Osteopathic Physician*, appeared under

its new title in February, 1902, and has been issued regularly each month since, with Dr. Bunting as its editor. Its mission is to inform the laity concerning progressive, up-to-date health science and the treatment of diseases by a more successful method than giving drugs. It is used largely by osteopaths for distribution within their field of practice as a means for enlightening the people rather than as a medium for advertising themselves.

The *Missouri Osteopath* was first issued in 1903 or 1904, from Plattsburg, Missouri, with Dr. Charles E. Boxx, editor. It was sold to Mrs. Annie I. Peters, Kansas City, Missouri where it has been published since October, 1904, by the Missouri Osteopathic Publishing Company. Later its name was changed to the *Kansas City Osteopath*.

Osteopathy, a monthly journal of natural methods in health and disease, is a commendable journal, published by The Osteopathy Co., Atlanta, Georgia. It is now in its second volume.

The *Student* is in its third volume. It is a monthly publication printed by the students of the American School of Osteopathy and devoted to their interests.

The *Osteopath*, the *Right Way*, and the *Osteopathic Herald* are the most recent candidates for favor. They are designed for the general reading public and are intended to be used by the profession for promotion purposes.

A number of osteopaths in different parts of the country have tried the plan of issuing a journal for the promotion of their own business and the promulgation of ideas concerning osteopathy. Some of these, as the *Eastern Osteopath*, the *Osteopathic Digest*, and probably several others, have been creditable journals and have done good in their way. Others have been poorly stocked with material, poorly edited, poorly printed, and probably did much more harm than good. Most of them, fortunately, for the profession at large, have been short lived.

Circulars, Etc.

Scores of small circulars or booklets have appeared from time to time, issued by individual osteopaths for the purpose of promotion. Many of these have not been objectionable from the character of their contents or the style of their make up; others presented such unmistakable

evidence of lack of culture and education that they have, in many cases, tended to bring the profession into disrepute.

Among those most deserving are the following: two by Dr. Charles Hazzard, one called *Osteopathy the Better Way to Health*, the other *The Osteopathic Way is the Best Way*; and Dr. F. J. Fassett's *Osteopathy, Its Theory, History, and Scope, and Its Relation to Other Systems* are scholarly productions suitable for the general reader. Dr. J. Martin Littlejohn's pamphlets entitled *The Science of Osteopathy, A Treatise on Osteopathy, and Osteopathy—What It Is* are more elaborate than the first mentioned and appeal to the scientist as well as the average layman. Mentioning the above is not intended to exclude others belonging to the same class, ones that are probably just as meritorious.

The Osteopathic Yearbook

The Osteopathic Yearbook is the only representative of its class. It is edited and published by William R. Dobbyn & Sons, Minneapolis, Minnesota. The first number was given to the public in May, 1904. It contains a complete directory of the profession, a brochure on osteopathy by Dr. E. R. Booth; a Digest of State Osteopathic Laws and much valuable information concerning osteopathic organizations and colleges. The second number appeared in May, 1905. Besides the complete directory of the profession, it contains a brief report of the St. Louis meeting of the American Osteopathic Association, an elaborate article on "Comparative Therapeutics," by Carl P. McConnell, MD, DO, a history of osteopathy during the last 12 months, legal and legislative notes, lists of books and authors, publications, colleges, sanitariums, college societies, state, district, and local societies, state osteopathic boards, a roster of state society officials, and a digest of osteopathic laws.

Charts

Several charts have been published that are useful to the osteopath and helpful in explaining the effects of disturbances to the physical organism to others. Among these may be mentioned Eales' and Taber's, Littlejohn's and Dunnington's, Helmer's, Welsh's, Smith's, and probably others of decided merit. □

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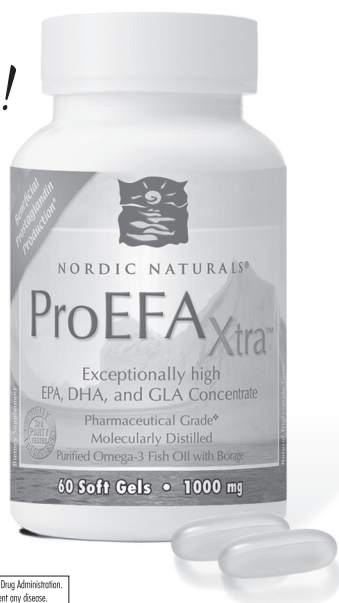
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Neuromusculoskeletal Causes of Back Pain in Competitive Figure Skaters

Stephen I. Goldman and Mitch Moyer

Abstract

The authors have experienced a dramatic increase in the number of complaints of back and upper leg pain in competitive figure skaters. These injuries appear to be due to repetitive overuse patterns and resultant overdeveloped muscle groups. This paper explains the neurologic and musculoskeletal causes of these injuries and proposes changes in equipment and exercise regimens to reduce the number of these overuse injuries.

Introduction

The incidence of back and upper leg injuries in competitive figure skating has not been well documented except in pairs skaters.^{1,2} The authors, however, have recently experienced a dramatic increase in complaints of back pain among the higher competitive levels of both freestyle and pairs figure skating. These injuries appear to be caused by repetitive overuse due to skaters consistently rotating, jumping and falling in one direction, resulting in certain muscle groups becoming overly developed. The following patterns have been observed:

- 1) The increasing frequency of back pain appears to be directly related to the higher degree of difficulty of multi-rotational jumps (i.e., triple and quad jumps) as well as the number of jumps and repetitive impact of landings at all competitive levels, especially Novice, Junior and Senior levels.
- 2) The cause of these back injuries appears to be due to a) neuromuscular imbalances resulting from tight hip

flexors, and b) over-dependence on the mid and upper torso rather than the legs and hips to initiate jumps and control landings.

- 3) Injuries also occur due to falling as the upper body rotates ahead of the hips and legs.

Classification of Jumps

For discussion purposes, all jumps will be described as counterclockwise rotational jumps (skater rotates counterclockwise as viewed from above during a jump). Jump families are separated by which leg is the take-off leg (the leg that leaves the ice last).

Group one jumps are the axel family of jumps (Table 1), and include the axel, toe loop, and salchow. In this jump family, the last part of the body that leaves the ice is the left skate pick. The skater lands on the opposite leg that initiated the jump (the right leg).

Group two jumps are the loop family of jumps (Table 2), and include the loop, flip and lutz. In this jump family, the last part that leaves the ice is the right skate pick, and the skater lands on the same leg that initiated the jump (the

Table 1

<p style="text-align: center;"><u>AXEL FAMILY OF JUMPS</u></p> <p style="text-align: center;">AXEL TOE LOOP SALCHOW</p>

Table 2

<p style="text-align: center;"><u>LOOP FAMILY OF JUMPS</u></p> <p style="text-align: center;">LOOP FLIP LUTZ</p>
--

right leg).

Back Mechanics and Jumping

A jump is initiated from the legs. The proper position of edge and pick is set into the ice by the intrinsic foot muscles and the lower leg and calf. Power is then transferred to the quadriceps and hip flexor muscles to initiate the jump. This often leads to tight, strong quadriceps and hip flexors (iliopsoas and iliacus). Momentum is then transferred to the gluteal muscles as the hip extends and upward rotation off the ice is begun. Extension and flexion of the hip has been shown to significantly correlate with jump height.³

The torso is then utilized, especially the erector spinae and left trunk rotator musculature to help propel the body upward and into the jump. The upper extremities then trail behind the upper body and are used to add extra power to the jump by propelling the shoulder girdles up and into the jump. Essentially, the lower extremities initiate, and the torso and arms assist the jump.

Pathomechanics of Freestyle Landings

Injuries that result from jump landings can be categorized into those that occur due to falling and those that occur due to neuromuscular imbalances. →

Falls

Injuries to the outside part of the right hip can occur if the skater “falls short” during a jump rotation (does not fully complete a turn). The skater will then fall onto the outer aspect of the right hip. Conversely, over-rotating a jump will cause the skater to fall onto the outer left hip and that may injure the left hip. In either case, the skater may develop a contusion or bursitis of the greater trochanteric bursa and/or contusion and spasming of the iliotibial band.^{2,4}

Figure 1a



Figure 1b



Hip Flexor/Neuromuscular Imbalance

Back problems may originate from overly-developed, shortened right hip flexors.³ The overall dominance of flexor muscle strength in the body, combined with overuse of the right hip flexors from repetitive landings will reflexively cause neurologic inhibition of the right gluteus medius. This tendency is due to the body’s tendency to over-develop and tighten the slow-twitch (tonic) postural muscles and neurologically inhibit and weaken the fast twitch

non-postural muscles.^{5,7} In addition, the eccentric load placed on the hip flexors after the impact of landing may also contribute to excessive hip flexor tightness. Stiffness and configuration of the figure skating boot also contributes to excessive landing forces being transmitted to the hip. Boot stiffness, combined with slight plantar flexion of the boot, lessens absorption of impact forces at the ankle, transmitting the forces to the knee and hip. This may also contribute to overuse of the hip flexors, resulting in excessive hip flexor tightness.

The resultant weakness of the right gluteus medius will result in a decreased ability to elevate the left pelvis and maintain pelvic stability (Figure 1). The right piriformis muscle then excessively contracts. The pelvis twists clockwise as viewed from above (the right side of the pelvis rotates posteriorly and thus the left pelvis rotates anteriorly). The pelvis undergoes a lateral translatory shift to the right into the direction of the pelvic rotation. This shifting and rotating of the pelvis in the opposite direction of the trunk rotation causes the skater to lose balance.

In an attempt to regain balance, the skater will then use three methods to return the trunk to a more vertical position: a) recruit the right hip adductors, b) internally rotate the right leg and pronate the foot, or c) recruit the left trunk rotators and the left quadratus lumborum muscle. Since conditioning the hip adductors is not part of the usual workout and strengthening routine for many skaters, proximal tendinitis and generalized muscle soreness of the hip adductors are common as the skater continues to over-utilize this muscle group to help stabilize the pelvis. Internal rotation of the right leg and hyperpronation of the right foot will often lead to early boot breakdown and possible tendinitis of the tibialis posterior and/or plantar fasciitis. If unstable foot mechanics already exist, an orthotic may become necessary for symptomatic relief and correction of the foot and ankle pathomechanics. Injury to the ankle has also been shown to delay onset of activation of the gluteus maximus.⁶

Tightness of the iliotibial band may result from weakness of the gluteus

Figure 2



medius. This problem, which also exists in runners, results as gluteus medius weakness increases adduction of the thigh and internal rotation of the leg at landing (midstance in runners) causing increased valgus at the knee. This will result in overuse of the thigh adductors and may also cause increased tension on the iliotibial band at foot/boot contact with the ice.^{8,9}

Overpronation of the foot and ankle (Figure 2), especially of the landing leg, may be due to compensation for the internal rotation of the entire limb due to pathological trunk mechanics or from an underlying mechanical problem of the foot and ankle. In addition, abandoning school figures with the emphasis on jumping may have inadvertently created a generation of skaters with weaker foot intrinsics and poor lower extremity proprioceptive training, resulting in overpronation problems for skaters and increased number of back injuries. Before the decision to use orthotics is made, it must be determined whether the pronation is a primary foot/ankle problem or a secondary problem

that can be corrected by improving the mechanics of the lower extremity and trunk.

Pathomechanics of Freestyle Takeoffs

Along with the impact of landing and falling, we are seeing that the developing skater has a tendency to rotate the upper body sequentially ahead of the hips in order to add power to the jump takeoff. This is causing a rise in the incidence of mid and low back pain and back injury. We have identified two possible causes of these mid and low back injuries.

Hyper-pronation/Limb Malrotation

Hyper-pronation of the feet will cause a marked internal rotation of the lower legs, forcing the skater onto the inside

edge of the blade. In compensation, the involved hip externally rotates (turns out) and the pelvis will shift to the right (the same scenario as during landings). The right hip adductors and the left trunk rotators will suffer from overuse as the skater overutilizes these muscle groups to maintain the trunk in a vertical position.

Adding Power to the Jump Takeoff

The skater may become overly dependent on the left trunk rotators to initiate and add power to the jump. A common error in jumping is over-utilizing the mid back and arms during the jump. While the usual muscle pattern exists in the foot and legs to start the jump (see section on Back Mechanics and Jumping) the mid-back is used much more extensively to pull the skater up and into a jump. This puts a much greater stress and dependence on the back to initiate and maintain jumps. The skater starts to prepare for rotation too quickly by throwing the shoulders back,

hyperextending and over-rotating the back to add rotation to the jump. As the jump begins, the flexed upper extremities will be driven upward and to the left, initiating the counterclockwise and upward motion of the jump. The upper extremities thus become the major power for rotation limiting the contribution from the legs since the jump in essence begins too quickly.

This over-dependence on the trunk rotators often arises from relative weakness in the lower extremities, either in the foot/ankle flexors, hamstrings or hip flexors. This problem may arise in spite of proper coaching techniques to maintain a vertical takeoff. Skaters often discover that it is easier for them to focus on the power that they can generate by overutilizing the mid back region rather than relying on proper takeoff technique which originates in the legs.

Thus, trunk rotator injuries can occur both at takeoff and landing:

- 1) at landing in the attempt to correct vertical trunk position that originates from tight hip flexors
- 2) at takeoff in the attempt to add power to the jump due to hyper-pronation of the foot and ankle or from weakness in the lower extremities.

Injury Prevention

Two previous studies^{1,10} have demonstrated a lack of adequate warm-up and a higher incidence of injuries during practice time. The key to preventing back and shoulder injuries is to incorporate a rigorous stretching program for the chronically tight muscles groups into warm-ups and cool-downs and to develop strength in the neurologically inhibited muscle groups.

In order to assure that a strengthening program for the inhibited muscle groups will be of maximum benefit, however, stretching of the tight muscle groups must precede the strengthening program. In addition, the skater must begin and end each skating and workout session by stretching the tight muscle groups.

Foot and ankle mechanics must also be addressed:

- 1) correction of underlying pathomechanics by using appropriate orthotics to correct hyper-pronation or hypersupination. Correct boot selection is also greatly important.
- 2) if abnormal foot mechanics are not due to a primary foot problem, then the coach must be sure to closely examine the skater's back and pelvic mechanics to see if the foot problem is secondary to abnormal back and pelvic mechanics.
- 3) the skater should perform rotational exercises in the opposite direction of the usual jump rotation.
- 4) the skater should perform balance exercises to strengthen and stabilize hips and ankles.

Back and hip muscular imbalances (Table 3) can be corrected by incorporating these changes into the skater's training program:

1) The skater must diligently stretch the hip flexor/iliopsoas muscle group of the landing leg. This is of utmost importance to help stop the cycle of inhibition/weakness in the gluteus medius. This must be done at the beginning and end of every off-ice workout to break the cycle of inhibition. In addition, if the hip flexor group is not adequately stretched out, then strengthening of the gluteus medius muscle will be ineffective, since the cycle of neurologic inhibition originating in the opposite hip flexors will prevent the skater from strengthening the gluteus medius.

This is perhaps the most important

aspect of changing the skater's training program since the imbalance between the hip flexor mechanism in the landing leg and the gluteus medius mechanism will cause the development of unstable back mechanics as stated above.

In addition, the skater should also incorporate stretches for the right piriformis into a stretching program. This will prevent over-rotation of the right hip and pelvis during both takeoffs and landings.

2) The skater should incorporate stretches for the trunk rotators into the off-ice training program. These should also be done at the start and finish of each on-ice session. Once the tight muscle groups have been adequately stretched, then a strengthening program can begin with special emphasis on the weaker muscle groups. This is important to help prevent further over-development of the tight muscle groups and to help the skater develop symmetric truncal strength.

3) The skater should incorporate balance training into the off-ice program. Instruction in mini-trampoline exercises and Swiss Ball trunk stabilization will assist the skater in retraining the small intrinsic back musculature (rotatores, multifidi and intertransversarii) which are responsible for the fine motor control and balance reflexes of the spine.⁵ These exercises will assist the skater in developing better proprioceptive control of the trunk, hips and lower extremities as well as in gaining strength in the gluteus medius. These exercises combined with these stretching programs will help to prevent overuse injuries to the trunk and leg, as detailed above.

Osteopathic Treatment

Osteopathic Manipulative Medicine (OMM) can play a vital role in treating the muscle imbalances and structural changes that have been previously described. The decision as to which OMM techniques to use should be tailored to the patient's individual needs as well as to the expertise of the treating physician. The authors feel, however, that OMM treatment should address both segmental and soft tissue mechanics to help restore normal neuromuscular functioning of the lower extremity, pelvis and trunk.

During initial examination, the physician should look for evidence of leg length difference and upslipped innominate/shear. These problems must be addressed before other postural problems can be treated, as unleveling of the sacral base must be corrected before addressing trunk mechanics. If a heel lift is indicated, both the front and rear of the skating blade must be shimmed to the necessary lift height to avoid tilting the boot into excessive plantar flexion.

Hip flexor tightness as well as any corresponding innominate rotations and sacral rotations/flexions should then be corrected. Soft tissue mechanics of the quadratus lumborum and trunk rotator mechanisms should be treated (abdominal obliques, latissimus dorsi) as well as segmental lesions of the thoracic and lumbar spine. Finally, the thoracic inlet, cervical and craniosacral mechanics should be treated for any motion dysfunction.

This order of treatment is based on the concept that jumps and landings originate in the legs and progress upward through the hip, pelvis, and trunk. OMM treatment should start where the dysfunction begins and follow the motion dysfunctions upward through the body. Starting treatment in the lower extremity and pelvis, especially the tight hip flexor, will resolve the neurologic inhibition of the gluteus medius and prevent recurrence of the trunk neuromuscular imbalances. These patterns will tend to recur, however, unless changes are made in the off-ice training program as described above.

Table 3

<u>LOW BACK/HIP MUSCLE PATTERNS</u>	
<u>TIGHT/OVERDEVELOPED</u>	<u>WEAK/INHIBITED</u>
ILIACUS (landing leg) ILIOPSOAS (landing leg) HIP ADDUCTORS (landing leg)	GLUTEUS MEDIUS (landing leg) GLUTEUS MAXIMUS (landing leg)

Conclusion

The increasing frequency of back, trunk and core body pain and injury can be addressed in competitive figure skaters by understanding and correcting abnormal biomechanics. Special emphasis on stretching the hip flexor mechanism of the landing leg, combined with strengthening the opposing hip stabilizers, balance retraining and use of appropriate orthotics, will allow the skater to initiate and land jumps more effectively and will lessen the overuse injuries to the back. OMM can also be used to help correct neuromuscular imbalances and structural dysfunctions.

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The purpose of the quiz found on the next page is to provide a convenient means of self-assessment for your reading of the scientific content in the "Neuromusculoskeletal Causes of Back Pain in Competitive Figure Skaters" by Stephen I. Goldman, DO, FAAO and Mitch Moyer. For each of the questions, place a check mark in the space provided next to your answer so that you can easily verify your answers against the correct answers that will be published in the September 2007 issue of the AAOJ.

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CME QUIZ

- 1) Figure skating jumps are initiated:
 - a) by mid-torso musculature
 - b) by rotation of shoulders
 - c) by hip flexors
 - d) by the foot musculature
 - e) by pelvic rotation

- 2) The strength of which joint system has been correlated with jump height?
 - a) foot/ankle
 - b) knee
 - c) hip
 - d) lower back
 - e) shoulder

- 3) Right gluteus medius weakness will result in:
 - a) decreased ability to elevate right hip
 - b) decreased ability to elevate left hip
 - c) tight left piriformis
 - d) pelvis twisting counterclockwise
 - e) pelvis translating to the left

- 4) Which of the following is true regarding injury prevention for figure skaters?
 - a) stretching hip flexors of takeoff leg
 - b) stretching hip flexors of landing leg
 - c) performing rotational exercises in same direction of jump rotation
 - d) strengthening of weak muscles should precede stretching of tight muscles
 - e) all of the above are necessary components to an off-ice program

- 5) Correction of limb length difference in figure skaters should be done by:
 - a) shimming the toe of the blade
 - b) shimming the heel of the blade
 - c) shimming both the toe and heel of the blade
 - d) exercise/stretching only
 - e) using orthotics only

- 6) The goal of balance training as part of the off-ice program is to:
 - a) assist in retraining the large back muscles
 - b) strengthen the hip flexors
 - c) strengthen the foot and ankle flexors
 - d) strengthen gluteus medius and back intrinsic muscles
 - e) strengthen the piriformis

Alleviating Atypical Tender Points Through the Use of Myofascial Release of Scar Tissue

Brett P. Thomas

Through the years, experienced physicians have stressed the importance of treating scar tissue using osteopathic manipulation. I was taught to use an indirect technique to treat the scar. After I treated the scar, I noted that the surrounding tissues were not as tight. I had never read any studies, however, regarding osteopathic treatment of scars which showed direct correlations with resolution of the patient's symptoms. Recently, I have found a correlation between treating scar tissue and changing the symptoms of atypical tender points.

Through the years of treating patients, most practitioners will probably tell you that they have come across atypical tender points in various patients. Lawrence Jones, DO stated that about five percent of the time an atypical tender point is found which he has termed as "maverick" point. A maverick point is a tender point which is relieved by positioning the patient in the position opposite of what one would expect for a tender point at that location.¹ Jones gives no explanation for these atypical tender points. I am proposing that by using indirect myofascial release technique on scar tissue remote from the atypical tender point, it is possible to change the character of the atypical tender point.

Three years ago while performing an examination on a patient, I found a maverick point. The patient was a 36 year-old man who had complained of having generalized achy pain in his right arm for two weeks. The pain was located over his right bicep muscle beginning just below the shoulder and ending at the anterior right elbow. He denied any history of trauma or overuse. He woke up one morning with the pain. His physical findings were fairly benign. He had OA compression bilaterally with the right side more compressed than the left. His vertebrae were as follows C3S_RR_L, T1FS_LR_L, T3FS_RR_R, and L5FS_LR_L. He had mild muscular contraction in his upper thoracic region. He had full range of motion on his right shoulder and right arm. I did find a tender point in the proximal belly of his right bicep. I flexed the right arm as would have been typical to get relief of the tender point, but the area remained tender. I then extended the right arm. The right bicep tender point got relief as I placed the arm in extension as opposed to flexion. I treated the tender point by holding the extremity in the position of decreased tenderness for 90 seconds as recommend by Jones's strain-counterstrain technique.² When I finished, the muscle felt more relaxed, however there was still some residual tenderness in the bicep muscle. I then treated a small scar, that the patient had, on the dorsal portion of the arm over the tricep muscle.

This scar was from surgical removal of a mole several years prior. I used indirect technique on the small scar. I followed the tissues in the direction of ease. Immediately after I had finished releasing the tightness of the scar tissue, I rechecked the belly of the bicep muscle, which previously had been tender. The tenderness had resolved. He stated that his arm felt great. This event made me curious. I asked myself whether it was just the fact that more time had elapsed after treating the muscle that caused the residual muscle tenderness to resolve. If the residual tenderness resolution was not due to the increase time (a few minutes) then it must have been resolved by the indirect release of the scar tissue since that was the only other treatment that had been performed on the patient.

Over the next two years, I found several other atypical tender points which would improve if the muscle associated with the tender point was lengthened rather than shortened. When I found an atypical tender point, I would ask the patient if he or she had any scars. I would treat the scar using an indirect technique. I would re-evaluate the previously noted atypical tender point. Interestingly enough, the tender point invariably changed in character. The tender point would be relieved by shortening the muscle rather than lengthening the muscle. It is interesting to note that the scars were of various sizes and locations. The scars that caused these atypical tender points could be anywhere on the body. The scars could be on the opposite side of the body away from the muscle with the tender point. The scars could be lateral to the muscle. The scars could be distant or close to the tender muscle.

In each of the cases of treating the atypical tender point after treating the scar, I was able to find a position where no tenderness remained as I shortened the muscle. Finding a body position in which there is no tenderness is, of course, optimal as a physician uses counterstrain to treat the tender point. This is important since frequently as a person tries to find the position of least tenderness, there could be 75 percent or more decrease in pain without finding a position of full relief. After finding the body position in which the tender point was without pain, I held the limb or body in the position of the shortened muscle until the muscle would relax. It would usually take close to 90 seconds for the muscle to relax, as recommended by Jones for treatment using strain-counterstrain technique. I then returned the body to a neutral position and rechecked the tender point, which would typically have resolved.

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I had a very interesting patient who complained of burning pain and occasional dull pain in her right anterior and medial thigh for two months. The pain began one day after she had played tennis for two hours. The pain worsened if she ran. The pain would decrease if she took Motrin. She stated that the pain was a 5 using the pain scale of 0-10 with 0 being no pain and 10 being the worst pain that could be imagined. The pain caused her to have some difficulty walking. I performed a physical exam on the patient. Noteworthy findings included a tender point on the belly of the right adductor muscle; sacrum was rotating left on a right diagonal axis; lumbosacral compression; L5FS_{RR}; L2FS_{RR}; lumbar and thoracic paravertebral muscle spasms; right psoas muscle tight; T12FS_{LL}; T3FS_{RR}; OA compression; cervical paravertebral muscle spasm. I could not find a specific tender point. Instead, it was a dispersed area of pain. I tried finding a position of relief for the area of the adductor muscle by adducting the muscle. The pain did not have relief until I abducted the right lower extremity; even then the pain was only about 50 percent better. Instead of trying to use strain-counterstrain technique to begin treatment, I decided to treat her scar from a tubal ligation she had 20 years prior. I examined her three-centimeter scar at the lower portion of the umbilicus. The scar was tight but not raised very much.

I placed two of my fingers on top of the scar. I then checked the direction of ease of motion of the tissues, and followed the tissues in that direction. This is known as an indirect technique.

The result of treating the scar was surprising. I had expected the area to go from a wide area of pain to a more specific tender point. I then expected to resolve the tender point by using strain-counterstrain techniques. Instead, I found complete and immediate resolution of the painful tender area in her right thigh. The burning sensation had also vanished. After I noted these unexpected changes, I decompressed the OA and applied muscle energy techniques for the thoracic, lumbar and sacral regions.

Technique for Releasing the Scar Tissue

There are various ways in which to release or change tension of the scar tissues. Some physicians will inject the scar tissue with various substances including corticosteroids, procaine and lidocaine hydrochloride. My preference is using an indirect release of the tissue. The indirect technique is very versatile. If performed properly, there is minimal pain or tissue damage experienced by the patient. It can be used at practically any time after an injury in order to help healing. I have used it within hours after a surgical repair of a laceration of 12 inches in length. The arm had swollen so much from the inflammation that the patient could not flex his forearm. I used an indirect release of the myofascial tissue within 1-2 mm of the borders of the sutures. Within minutes the swelling had decreased considerably so that the patient could move the arm. It just happens that all of the scars that were used to treat the atypical tender points had occurred between 5-12 years prior to the treatment.

I have treated the scars of eight patients, which resulted in change of their atypical tender points. All of the scars were between one to four centimeters in length. All of the scars except one were results of tissues being approximated surgically. The

one scar that was not closed surgically was two centimeters in length and healed by secondary intention. None of the scars had heavy keloid formation.

Indirect technique release of the scar is obtained by placing fingers on the scar. Gently move the tissue in different directions to determine in which direction the tissue prefers to move. I move the tissue to the right, then to the left, then upwards and then downwards. After I determine which direction the tissues like to move, I gently move the tissues in the direction of least resistance. As the tissue is moved in the direction of least resistance, I will come to a point of balance of the tissues. At this point of balance, I feel equal tension on the tissue under my fingers around the circumference of that tissue. I hold the tissue in that position of balance until I feel the tissue under my fingers relax in a particular direction. As the tissue relaxes, it is as if my fingers are lightly being drawn to the area of freedom. I will then come to another area in which the tissues under my fingers will have tension balance in all directions. I hold the tissue in that position until the tissue's tension again releases in another direction. I continue this process of following the tissue as it releases in a new direction until the tissue stops releasing in any direction and the tissues under my fingers are in a state of balance tension and relaxed. Sometimes, I might come to a point of balance tension in which the tissues are still tight. I will ask the patient to take three deep breaths, which will typically augment the tissue in releasing the tension in that position. After I have released the tension of the scar, I remove my fingers from the scar, place my fingers on the tissues on and around the scar, and gently move the tissues in all directions in order to check the tissue change made by the treatment. Typically, the tissue is more pliable, softer, warmer, and less dry. This ends my indirect release of the scar tissue.

Generally speaking, the connective tissues of scars are compressed and tight. There maybe a degree of loading force involved. In order to reach a balance of tension, typically the physician must increase this compression into the area. He must also induce a load, which matches the force of the load present in the tissue. Connective tissues under sustained load will extend in response to the load. In biomechanical terms, this continued extension is referred to as "creep". An imposed constant load will result in relaxation of the tissue as the extension remains constant. The tissue will then be able to extend more and be less tight than in its original state.³

Embryology of Connective Tissue

In order to explain the connection between the muscle tender points and scar tissue, I feel it is important to look at the formation of the tissues as the germ layers form. All four basic tissue types come from just three germ layers. The germ layers give rise to the following specific tissue types. **Ectoderm** forms all nerve and some epithelia.⁴ **Mesoderm** forms all connective tissues (except the head which has some of its connective tissue from a specific ectoderm derivative called neural crest), muscle and some epithelia.⁵ **Endoderm** forms some epithelia.⁶

The mesoderm divides in regions at the end of week three, which helps differentiate the tissues more specifically. The mesoderm regions are: axial, paraxial, intermediate, and lateral plate mesoderm. The axial mesoderm forms the notochord. The paraxial mesoderm forms into somites after passing through a somitomere

stage. Somites are the specific portions of the mesoderm that give rise to all skeletal muscle, some specific bones of the body and some connective tissue components of the skin. Each region of somite forms specific tissues.⁷ The dermis arises from the mesodermal cells derived from the dermatome of the somites or other mesenchymal cells located just beneath the ectoderm. (In the face and parts of the neck, dermal cells are descendants of cranial neural crest ectoderm). In the paraxial mesoderm is a special section of mesoderm called the mesenchyme. Mesenchymal cells, which are the embryonic stem cells for fibroblasts and other connective tissue cells, migrate among the cell throughout the tissue, to inhabit all three layers (ectoderm, mesoderm, and endoderm). They secrete reticulin into the interstitial space, which becomes a fibrous intercellular matrix. This matrix is like a fibrous net as it slowly is replaced by collagen and elastic fibers. This network becomes known as the fascia.⁸ As differentiation begins, many events are happening at once. There are many factors which determine what the mesodermal cells will differentiate into. Some of these factors are the influences of the surrounding ectoderm, the information already contained in the mesoderm, location of the mesoderm tissue, and the amount of differentiating which has already occurred.⁹ I will use the early budding of a limb to help me describe the formation of the muscles and connective tissue in an area of the body. Initially, the limb bud mesenchyme consists of exclusively cells from the lateral plate mesoderm. These cells give rise to the skeleton, connective tissue, and blood vessels. Mesenchymal cells derived from the somites migrate into the limb bud as precursors of muscle cells. Another population of migrating cells is that from the neural crest, which ultimately form the Schwann cells of the nerves and pigment cells. Limb development occurs as the result of continuous interactions between the mesodermal and ectodermal components of the limb bud.¹⁰

The musculature of the limb is derived from myogenic cells that migrate into the limb from the somites. These cells, which are morphologically indistinguishable from the other mesenchymal cells, spread throughout the limb bud and keep pace with the elongation of the limb bud. Shortly after the condensation of the skeletal elements take shape, the myogenic cells themselves begin to coalesce into two common muscle masses. One becomes the precursor of flexor muscles while the other becomes the extensor muscles. The next stage in muscle formation is the splitting of the common muscle masses into anatomically recognizable precursors of the definitive muscles of the limb. The fusion of myoblasts into early myotubes begins to occur during these early stages of muscle development. Little is known about how this is done. Evidence suggests that myogenic cells follow the lead of connective tissue cells (such as the fascia), which are the bearers and effectors of the morphogenetic information required to form anatomically correct muscles.¹¹

The purpose of going back to the embryological aspect of development should aid the practitioner in getting an idea how and where the fascia is derived. I also wanted to emphasize that the mesenchymal cells from the paraxial mesoderm disperse through all three layers of the embryo to form a reticular matrix or net, the precursor and foundation for the fascial net, which helps maintain spatial relationships among the rapidly differentiating cells. Since this fascia surrounds all of the muscles and organs, disruption or damage to this tissue can affect the tissue it surrounds.

Dermal Repair

The repair of the dermis is very long and complex. It consists of a fibroproliferative response that is usually remodeled into a fibrotic scar. It is not a linear set of actions, but is divisible into three overlapping phases: inflammation, tissue proliferation and tissue remodeling.

Inflammation: after the tissue is injured, an inflammatory process begins with the activation of platelets and mast cells. The platelet aggregation and blood coagulation promote clot formation in the vessel lumen allowing hemostasis; the clot within the wound space provides a provisional matrix for cell migration. Damaged tissue and bacteria are removed from the site. Macrophages release growth factors, which are essential formation of granulation tissue during the proliferation phase of repair.¹²

Proliferation and tissue formation: this phase is marked by proliferation of fibroblasts, the migration of endothelial cells and the process of neovascularization and keratinocyte migration.¹³

Re-epithelialization of a wound begins within hours of the injury. Keratinocyte migration seems to occur at about the same time. Studies have shown that it is a different event from re-epithelialization. In fact, keratinocyte migration, rather than proliferation, is actually responsible for most of the resurfacing of the epidermal defect. The process of re-epithelialization in acute wounds is quite different than what occurs in wounds that fail to heal. The events regulating keratinocyte migration have to do with changes in the shape of keratinocytes, in restructuring of their cytoskeleton and keratin expression of proteases. Migration is made possible by a change in gene expression of the cells, involving temporary dissolution of hemidesmosomes and desmosomes, freeing the cells to move, and formation of peripherally located actin filaments which enables them to do so. Suprabasal keratinocytes seem to “leapfrog” over basal cells. These cells, after moving, begin to divide, producing a new supply of cells, some of which add to the thickness of the regenerated epidermis.¹⁴

If the injury disrupts the basement membrane, the keratinocytes migrate over a temporary matrix of fibronectin. Once the migration ceases, the temporary matrix is replaced by basement membrane. Once re-epithelialization is complete, the keratinocytes go back to their original phenotype.

Immediately after an injury, the wound becomes hypoxic due to the severance of blood vessels. This hypoxia, early in an injury, enhances fibroblast formation. Fibroblasts produce large amounts of collagens, proteoglycans, elastin, and other matrix proteins; and participate in wound contraction. Fibroblasts are the key cell in fibroplasia. Fibroplasia refers to the formation of granulation tissue and reconstitution of the dermal matrix. A new connective tissue is formed. Some fibroblasts undergo a further phenotype change to actin-rich myofibroblasts. The myofibroblasts are largely responsible for wound contraction and are present in granulation tissue. Myofibroblasts undergo organization along the lines of contraction. They play a major role in hypertrophic scars. The ultimate amount of contracture depends upon the depth of the injury. The deeper the injury, the greater amount of the contracture.¹⁵

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Angiogenesis is an important part of the proliferation phase. Without it, invasion of the wound bed by fibroblasts and macrophages would cease due to the lack of oxygen and nutrients. The chief cell of angiogenesis is the endothelial cell, which also undergoes cellular changes in order to migrate, proliferate and direct new vessel formation. Endothelial cells have been shown to synthesize fibronectin and collagen.¹⁶

The third and final phase is when the formed tissue is degraded and remodeled. The cells undergo apoptosis (cell death) and other changes. During the previous stages, we have had an over proliferation of tissue which was important to the healing process. However, now the tissue must be remodeled in order to more closely approximate the size and shape of the original tissue. This phase overlaps the proliferation phase, just as the proliferation phase overlapped the inflammatory phase. This phase may take several months or even years, during which most of the fibronectin is removed from the matrix and Type I collagen is slowly accumulated. The scar tissue is formed from randomly arranged fibrils, which gradually develop into large irregular masses without substructure. With the change in the characteristic pattern of the uninjured tissue, the tissue tends to lose its tensile strength and pliability. As the extracellular matrix matures over time, however the fibronectin and hyaluronic acid disappear, collagen bundles grow in size, increasing wound tensile strength, and proteoglycans are deposited, increasing wound resistance to deformation.¹⁷

During remodeling, however, the orientation of the fibers becomes less random and they become stronger if the tissue is active. The change in orientation may come from just normal use of the area of the scar, which thus produces mechanical forces, which reorient the collagen fibrils. If the scar or tissue, which is being repaired, is not activated, then the fibers will be laid down in an irregular pattern and the area will not be as strong, especially when activity to the area is resumed. The mechanical forces may also produce piezoelectric effect, which affects the arrangements of collagen fibrils and fibers.¹⁸ The piezoelectric effect is used to explain the mechanism behind Wolf's Law for bone transformation. Research has demonstrated connective tissue in bone produces electrical potentials from the mechanical stress placed on the bone. This electric potential influences the matrix formation of bone along the lines of force. The portion of connective tissue involved in these electric potential is collagen. This is the piezoelectric phenomenon, where the mechanical stress on the tissue is transformed into electrical potentials, and the electrical potentials are transformed into mechanical motion of the tissue.¹⁹ Even though over time the scar tissue changes orientation of the fibers and strengthens, it will only get to be about 70 percent the strength of the non-injured tissue.²⁰

Tender Point of a Muscle

Through the years it has been noted that, at times, muscles may have tender, tense areas within them. Janet Travell, MD referred to them as "trigger points."²¹ Lawrence Jones, DO referred to them as "tender points." We also have description of Chapman reflexes, which are also tender points in various areas, which refer to viscera dysfunction in another area of the body.²³ Korr and Denslow determined that a tender point is a manifestation of a facilitated segment, which expresses a somatic dysfunction

in the body which causes a change in the tissue texture, tissue deformability, elasticity, and other characteristics. The tenderness can be from a problem in the immediate area or from a distal point but, through innervations, may be associated to the tender point.²⁴

Scar Tissue and Tender Points

Injection of scar tissues in order to relieve pain has been done for many years. This has been known as neural therapy. In 1940 Ferdinand Huneke, MD injected an osteomyelitis scar on a patient's lower leg and immediately a previously intractable shoulder pain was cured. This immediate relief of pain became known as "lightning reaction" or "Huneke Phenomenon." Neural therapy is not limited to scars only. It can involve injection of local anesthetics into tender points, acupuncture points, tendon and ligament insertions, peripheral nerves, autonomic ganglia, the epidural space, and other tissues.

Trauma, surgery, or illness in any part of the body may develop blockages to healing, known in neural therapy as "Interference fields." Huneke has shown that excessive pathogenic stimuli can have their origin in the interference fields (centers of irritation) but can extend its influence to other parts of the body. The result can lead to pain or illness near to or distant from the site of the interference field itself. A patient may have more than one interference field all of which can prevent the patient from fully healing. The most common causes of the interference fields are scars and dental extractions.²⁵

In interference field scars where electrical resistance was measured, an abnormally high resistance (compared with normal skin) was found. In some cases, the electrical resistance was as much as ten times as high. The high resistance is felt to be a common occurrence for scar tissue. In fact, if it would be considered abnormal if the electrical resistance was the same as the normal tissue or lower.²⁶

The Continuity of Connective Tissue

Throughout osteopathic literature, the continuity of connective tissue, specifically fascia, has been stressed. From its embryologic origin in the mesoderm, fascia can be seen enveloping the body beneath the skin. The continuity of connective tissue can be shown from the head all the way down to the plantar fascia of the foot. The fascia surrounds each muscle and divides the different muscle groups yet always interconnected. Fascia contains sensory nerve endings and is thought to be elastic as well as contractile. Fascia supports and stabilizes the body. It is important not only in postural functions, but assists in the production and control of motion. The dura mater is a connective tissue, which surrounds the central nervous system. The dura mater has bony attachments in the skull and at the sacrum.²⁹

A scar can affect fascia by creating tension on it. This tension is not only felt in the immediate area but tension lines will affect the fascial tissue distally. This tension line to a distal area is often described as fascial drag. This fascial drag helps the physician determine where a disruption of the fascia occurs as he places his palpating hand on the tissues of the patient. I liken it to a tablecloth, which has a bowl on it. A physician is able to close his/her eyes while placing tension on the tablecloth. As one applies tension to the cloth, they are able to determine which

direction the bowl is located and how far away it is. It is easy to understand that a scar from a laparoscopic exam can cause a fascial drag on the abdominal muscles and tissues. This fascial tension can continue down to the muscles of the lower extremity causing a generalized pain in that region similar to what happened to one of my patients previously described.

Scar Tissue and Compensatory Pattern

When we have an injury to an area, typically that local area is not the only area affected. Not only do we need to be concerned with the fascial drag that is produced with an injury, but we also need to realize that the human body will adapt itself to changes, which are placed upon it from a traumatic source. These adaptive changes by the body are normally called compensatory changes. J. Gordon Zink, DO described the influence that fascia and its related structures have on the compensatory postural patterning.³⁰ Fascial tension influences the tissues and skeletal structures in its region which then influences the tissues and skeletal structures in the adjacent region which then affects the tissues and skeletal structures adjacent to it and so forth.

The compensatory response by the body illustrates how an injury or scar in one location can affect tissue and structure in a distal region of the body. The compensatory response can also cause the structure's function to be altered. A patient may have pain and altered structural function in one part of the body (e.g. right lower leg) which is secondary to its primary lesion e.g. laparoscopic excisional repair in another area of the body. What happens then, is that the physician will attempt to rid the patient of their pain in the lower extremity. The pain may leave for a short period of time after each visit and then return in less than a week. This is because the primary lesion has not been addressed so the primary lesion will continue to influence the tissue that is distal to it because of the fascial continuity. The painful lower extremity may not get fully resolved until the laparoscopic scar is addressed.

Discussion

I would like to state that the main purpose of this paper was to introduce the importance in treating scar tissue regardless of the size. This is especially true if a patient has a long-standing musculoskeletal problem that has not been helped by treating other areas using osteopathic manipulation. It is interesting that atypical tender points seem to be a result of the scar tissue, even if the scar tissue is several years old. I maintain that anytime a patient gets an injury or procedure which produces a scar, that scar should be treated. If there is an area of tissue disruption that will cause a scar, the tissue around the site should be treated immediately as well. This will allow the collagen to be laid down in a more normal alignment. There is evidence that shows that the pattern of collagen within granulation and scar tissue can be altered by local mechanical force or tension. This falls in line with Wolf's observation that structure follows function in the growth of bones. Let us recognize that both bone and collagen come from the same embryologic origin of the mesoderm. If the physician feels hesitant about treating the area around the wound immediately, then he/she can treat more directly on the scar after six weeks.

It is my opinion that the main cause of the change in the

atypical tender point is the fascial drag caused by the deformation of the tissue of the scar tissue. Fascia tissue runs through the body in a tubular fashion from the head down to the feet compartmentalizing the whole body. There are usually three layers of fascia: superficial, deep, and subserous. The fascia forms from the mesoderm and the mesenchyme cells move to all three germ layers. It is easy to understand the continuity of the fascia and how a dysfunction in one area can affect another area.

I would also like to stress that even though I feel that releasing the tension of the scars is important in treating patients, treatment does not end there. Osteopathic physicians must treat the whole body. The idea of treating the whole body makes it difficult at times for a practicing physician to always find the direct correlation of a particular technique and resolving the patient's problem. When I started to note the relationship of the atypical tender points to scars, I was careful to treat the scars first and note the changes before I did any other treatments to the body. Since I constantly saw immediate changes in the character of the atypical tender points after treating the scar tissue, I can confidently state the validity of my findings.

Future Research

I feel that monitoring the changes in the development of scar tissue at the wound site before and after myofascial release of the tissue around the injury, would help validate the treatment of incision sites post-operatively. This could be done with a high-resolution diagnostic ultrasound scanner, in which changes in the ultrasonograms of the wound bed can be quantified by means of image analysis, in which fractal signatures are produced of regions of interest of the ultrasonograms.²⁹ It remains to be demonstrated how efficiently this apparatus could detect changes produced by myofascial release. Perhaps other instrumentation will become available to demonstrate how myofascial release promotes the healing of tissues.

Collagen is the piezoelectric substance contained within the connective tissue (this includes bone) and is thus involved in responding to mechanical stress due to the scar tissue.³⁰ It has been demonstrated that non-stressed collagen has a resting potential. When the collagen is mechanically stressed, areas of compression become electronegative and the areas of distraction become electropositive. The cells are also able to differentiate the strength and direction of the mechanical stress.³¹ It would be intriguing to measure the microelectrical potentials of the tissues before and after treatment. We could also check more distal areas to see if they have any microelectrical potential before and after treatment of the scar tissue. Another type of research, which could be performed, is to test the electrical resistance before and after myofascial release of the scar. Both of these methods of research would reveal how myofascial release of fascial drag changes the bioelectric field along with the structural nature of the scar.

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Advanced Still Technique

Applications of a Rediscovered Technique

of Andrew Taylor Still, MD

August 17-19, 2007

Oklahoma State University College of Osteopathic Medicine
Tulsa, OK

Richard L. Van Buskirk, DO, PhD, FAAO
Program Chair and Author of
The Still Technique Manual: Applications
of a Rediscovered Technique of Andrew
Taylor, Still, MD

Course Description: Level II

Innovative approach using combined (indirect-direct) techniques in the treatment of common clinical somatic dysfunction.

Learning Objectives:

- By the end of this course, the attendee will know:
 - the history of the Still technique, its loss and recovery
 - the underlying method
 - segmental diagnostic techniques that are shared by this technique with HVLA and muscle energy techniques as well as those unique to the Still technique
 - specific applications of the technique to the cervical, thoracic, and lumbar spine, ribs, pelvis, extremities, muscles and tendons

Prerequisites:

The participant should have a basic understanding of functional anatomy and (1) Level I course

CME:

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

Program Time Table:

Friday, August 178:00 am - 5:30 pm
Saturday, August 188:00 am - 5:30 pm
Sunday, August 198:00 am - 12:30 pm
(Friday & Saturday include (2) 15 minute breaks and a (1) hour lunch; Sunday includes a 30 minute break)

Course Location:

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Ehlers Danlos Syndrome: A Case Report

Anjali Kumar, Scott T. Stoll, Kendi Hensel

Introduction

The history of Ehlers Danlos Syndrome (EDS) goes back to centuries where it is much described in early writings as the ‘Elastic Man’. In 1668, Job Janszoon van Meek’ren published the first written description and pictorial depiction of an individual with EDS. The first available photograph of a person with EDS is of Felix Wehrle in 1880. In 1891, A. N. Tschernogubow, a Russian dermatologist provided the first complete description of the syndrome in a 17 year-old and as such, EDS in Russian literature is to date described as “Tschernogubow syndrome”. Tschernogubow’s report is in the Russian language and failed to find a widespread audience.¹ The current description of EDS in literature is the result of the works of Edvard Ehlers (1901) and Henri-Alexandre Danlos (1908). The syndrome was coined as EDS in 1936 by Weber.²

Diagnosis and Classification

Ehlers Danlos Syndrome is a clinically and genetically heterogeneous group of disorders that result from defect in the synthesis or structure of collagen. The diagnosis of EDS is done clinically. The common features of EDS are skin hyperextensibility, joint hypermobility, and fragility of tissues. EDS is classified into sub-types based on the cause.³

Classic type

EDS type I and type II come under this category. Inheritance is autosomal dominant. The major diagnostic criteria are skin hyperextensibility, widened atrophic scars, joint hypermobility. The molecular defect is in the structure of collagen V. Some cases have been linked to a mutation in COL5A1 and COL5A2 genes, and other causes are being investigated.

Hypermobility type

EDS type III comes under this category. It is inherited as an autosomal dominant condition. The major diagnostic criteria include hyperextensibility and/or smooth, velvety skin and generalized joint hypermobility. Patients have recurring joint dislocations with chronic joint and limb pain. The inherent cause in some cases can be attributed to a mutation in COL5A3 gene.

Vascular type

EDS type IV results from mutations in the gene for type III procollagen encoded by COL3A1. This results in an abnormal collagen III with defective secretion. Inheritance is autosomal dominant with a significant number of cases being new mutations. Clinical diagnostic criteria include thin skin with vis-

ible veins, arterial/intestinal/uterine fragility or rupture, easy bruising, and characteristic facial appearance.⁴ EDS type IV is the only sub-type in which the patient has an increased risk of dying.⁵ Most affected patients survive the first and second major complications, but Ehlers-Danlos syndrome type IV results in premature death.

Kyphoscoliosis type

EDS VI is caused by a deficiency of lysyl hydroxylase, which is a collagen-modifying enzyme. Inheritance is autosomal recessive. The major diagnostic criteria are generalized joint laxity, severe muscle hypotonia at birth, scoliosis at birth that is progressive, fragile sclera and rupture of ocular globe. Diagnosis is made at birth by the presence of any three major criteria and laboratory testing.

Arthrochalasia type

This includes EDS type VIIA and type VIIB.⁶ Inheritance is autosomal dominant for both of these disorders. The major clinical diagnostic criteria associated with this syndrome include bilateral congenital dislocation of the hip and severe generalized hypermobility of the joints with recurrent subluxations. The basic defect is caused by mutations that result in deficient processing of amino-terminal end of collagen type I. The genes that are responsible are COL 1A1 and COL 1A2.

Dermatosparaxis type

EDS type VIIC follows autosomal recessive inheritance. It is the result of deficiency of procollagen I N-terminal peptidases caused by mutant alleles. Major diagnostic criteria are severe skin fragility, and sagging and redundant skin.

Other types

EDS type V has X-linked inheritance.⁷ EDS type VIII patients exhibit periodontic fragility. EDS type IX was reclassified as “occipital horn syndrome.” EDS type X has currently been shown in a single family. EDS type XI is now termed “familial joint hypermobility syndrome.”

Case Presentation

History

The patient is a 28 year-old Caucasian female who presents with the chief complaint of “pain in all joints.” Her rheumatologist who suspected a diagnosis of Ehlers Danlos Syndrome referred her to the OMT clinic. The patient complained of daily dislocations of various joints, which began at the age of three.

The most common joints affected include her thumbs, right shoulder, right knee and right hip. She had noticed loss of feeling and tingling associated with the dislocations. She reported chronic rib pain, especially with sneezing and coughing.

Past Medical History is significant for a pituitary tumor, which is not operable, migraine headaches, EDS, and bipolar disorder. She stated that she had a horseshoe kidney as well as a history of seizures.

Past Surgical History is significant for right shoulder surgery in 2005 secondary to chronic dislocations. She had a right knee surgery in 1993 for a patellar reattachment. She has had sinus surgeries at ages 12, 13, and 14. She also reported a jaw surgery to correct an overbite in 2002. She has had an ovarian cyst removed in the past.

Social History: The patient was, until recently, an executive in the Sales and Marketing department of a company, but is currently unemployed secondary to medical conditions. She denies any tobacco or illicit drug use, but reports occasional alcohol consumption.

Family History: Family history is positive for fibromyalgia, hypertension, and hypercholesterolemia in her mother as well as bipolar disorder. Patient's father has no significant medical history.

Current medications include Amiodarone pm seroquel 400mg daily, Topamax 50mg daily, Bromocriptine 2.5mg daily, Prozac 40mg daily, Clonazepam as needed.

Patient is allergic to sulfa drugs, Compazine, and Thorazine.

Review of Systems: ROS is positive for above chief complaint. The patient does report some weight gain over the past year. She is unable to exercise secondary to her hypermobility syndrome. The rest of the review of systems is negative.

Physical Examination: Vital signs were within normal limits. The patient rated her pain anywhere from a 2 currently, to a 10 when she has dislocations.

The physical exam was essentially negative except for some musculoskeletal findings. The patient had an overall increased ligamentous laxity and increased joint mobility throughout multiple joints in her body, particularly in her thumbs, shoulders, knees and hips. Her knees had tenderness bilaterally. The L5/S1 tender points were noted and in the right lower extremity at the knee she had tender points in the popliteal fossa, consistent with Jones Strain/Counterstrain points of the ACL and PCL. She also had peripatellar tender points around the entire right kneecap.

Assessment: Ehlers Danlos Syndrome, knee pain, low back pain, and bipolar disorder, migraine headaches, and pituitary tumor by history.

Treatment/Plan: OMT was performed utilizing Jones strain/counterstrain to alleviate tenderness at the above-mentioned tender points. The patient tolerated the procedure well. She reported decreased pain after the procedure. The patient was educated and given information on how she could self-treat her tender points. The patient was to consider possible physical or occupational therapy to strengthen muscle attachments in an effort to stabilize her joints. Water aerobics was also suggested as a low impact way to exercise. A postural survey would be done and treated to minimize any postural forces that would

encourage joint dislocation. The patient was asked to return to the clinic in one week for further evaluation.

On her next visit, the patient reported a pain level of 2 in right knee, right shoulder, and left thumb. She also stated that she had difficulties in self-treating her tender points as her joints dislocated during the treatment due to the pressure she applied. Treatment options were discussed with the patient with great emphasis on her hypermobility. The patient was advised to complete a postural survey to check for any sacral base inclination to ensure proper loading of joints and minimize any postural stress contributing to the dislocations.

Postural studies showed that the patient had a 1.4 cm leg length discrepancy when she was measured at the apex of the femoral heads, right greater than left. A 1.5 cm iliac crest discrepancy was measured, right greater than left. This resulted in a four-degree sacral tilt, right side higher than left. Using Cobb's method, an eight-degree levoscoliotic curvature of the upper lumbar spine was measured from superior T12 to inferior L3 end plates. On lateral view, Ferguson's angle was found to be 120 degrees.

Literature Review and Discussion

EDS is a heterogeneous group of heritable disorders of the connective tissue. Its incidence is estimated to be around 1 in 5000 with no racial or ethnic predisposition.

Treatment of patients with EDS proves to be a challenge, as there is no cure for the condition. Most treatments provided are palliative that revolve around the ramifications and complications of the condition. The three major clinical manifestations of EDS are skin hyperextensibility, joint hypermobility and tissues fragility. Joint hypermobility poses a huge problem for EDS patients as it leads to frequent dislocations of various joints. A major consideration in the management of an EDS patient would be to decrease the episodes of dislocations. A number of these patients suffer from spinal deformities like scoliosis. One leading cause of scoliosis is short leg syndrome. Short leg syndrome leads to sacral tilt, which further leads to a compensatory scoliotic curve in the spine. The sacral tilt and the scoliotic curve increase the risk of dislocations due to a non-optimal center of gravity. A heel lift can decrease the sacral tilt, thereby improving posture and providing a more stable sacral base and spinal alignment. This will lead to fewer episodes of dislocations. Therefore, a postural evaluation of an EDS patient should, therefore, be done to rule out any leg length discrepancy.⁸

A compromised postural alignment leads to stress on surrounding muscles leading to chronic, recurrent trigger points. Osteopathic manipulative treatment can help better prepare the muscles, joints, ligaments and supporting soft tissue for the postural change brought about by the heel lift.⁹ Chiropractic modalities have been used successfully to treat subluxations of joints in EDS patients. They have had improved function and decreased dependency on pain medicines.¹⁰ It should also be important to consider a light, strength-building exercise program to enhance muscle tone which can substitute for the decreased connective tissue support.¹¹ Postural corrective exercises can stretch shortened soft tissues and strengthen postural muscles. Hydrotherapy can be a low impact way of exercising and is also enjoyable.

→

EDS patients suffer from chronic pain secondary to their frequent dislocations and soft tissue damage. Pain begins early in their life and progresses over time. It is generally refractive to pharmacological interventions and significantly interferes with daily functioning. Patients have used analgesics, opioids, massage, chiropractic manipulation, etc. to help cope with the chronic pain.¹⁰⁻¹² A normal physiological reaction to a painful hypermobile joint is for muscles surrounding the joint to splint the joint and protect it from excess motion. Physical examination of the patient will reveal a restriction of motion. A high-velocity thrust technique may work to free up the restriction, resulting in a decrease in pain and an improvement in motion, but the treatment contributes to joint instability. The more the HVLA technique is used, the looser the joint will become.⁹ Due to the fragile tissues in an EDS patient, it is prudent to limit the treatment to relatively gentle techniques such as indirect, myofascial release, Jones' strain-counterstrain, balanced ligamentous tension. These mild treatments can relieve tender points, resolve muscle spasms, improve structural alignment, and balance tissues in order to provide relief over time with the body adapting to the new homeostatic state.

Chronic pain and disability lead to psychosocial challenges for EDS patients. Many of them suffer from anxiety, depression, anger, and, in general, frustration with the medical system. Patients are commonly referred to a range of specialists prior to accurate diagnosis. Many patients remain undiagnosed for years which leads to frustration. They have concerns about their relationships, social activities, and reproductive health. A significant percentage of patients have a history of use of mental health care.¹³ This chronic condition requires patients to cope with the disease over their lifespan and special attention should be given to the psychosocial well being of these individuals. These patients could also benefit from behavioral and cognitive therapy such as hypnosis and relaxation.¹² It has been shown that patients who have worked full-time accepted their disability to a greater extent than patients who were on disability. Patients who accepted their disability also had a greater sense of coherence and better functionality.¹⁴

Summary

There is paucity in osteopathic literature on the management of Ehlers Danlos Syndrome. Treatment of patients with EDS proves a challenge, as there is no cure for the condition. These patients need several treatment modalities simultaneously to take care, not only of their chronic pain, but the often equally important aspect of psychosocial well being. A multidisciplinary approach is required to help the patients limit their disability, cope with the disease, and rehabilitate them in their chosen profession.

The patient we saw exhibited many of the classic issues of EDS. She was in pain and was frustrated with the lack of cure and loss of employment. In order to manage her symptoms, she should be prescribed heel lift of the appropriate size. With the prescribed lifts, her sacral tilt should improve, which in turn should improve her mild scoliosis. Her significant right knee pain could be secondary to her surgery, but it could also be due to a longer right leg. A heel lift in the left shoe should remove the added stress on the right leg and improve the pain in right knee and hip. OMT should help the tissues and ligaments to adapt to changes in the posture following the use of a heel lift. Continuous assessment of the patient's pain and specific treatments to alleviate the pain,

should go a long way in making the patient comfortable.

EDS is not a rare phenomena. It is estimated to occur in about 1 in 5000 people, regardless of race or gender. Of the known types of EDS, hopefully the biochemical disorders will be amenable to treatment in the future. Until then, osteopathy provides the tools and techniques to help patients cope with the ramifications and complications of Ehlers Danlos Syndrome.

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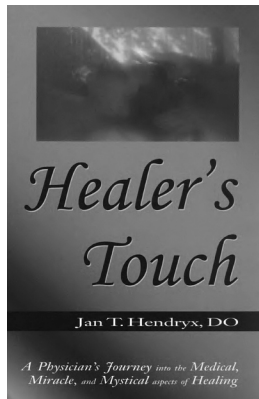
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BOOK REVIEW

Anthony G. Chila, Reviewer



Healer's Touch. Jan T. Hendryx, DO

pp. 237, incl. Index. Copyright © 2006 by Jan T. Hendryx. ISBN 0-9774049-0-0. Library of Congress Control Number: 2005909370. Published in the United States of America by Transformations Press. PO Box 7169, Mt. Jewett, PA 16740-7169. Available for purchase through the American Academy of Osteopathy.

In this volume, the author engages the reader in his personal voyage through tragedy and healing. A fatal injury to his youngest brother began a slow and agonizing journey of healing. This journey would prove to consume his life in many ways over subsequent decades. The outcome of this journey has been the development of an osteopathic physician.

Through the use of case studies and experiences, osteopathic philosophy and practice are discussed in detail. Chapter subheadings are indicative of the scope of the author's questioning about the medical system and the continuing development of osteopathic medicine. *What is Healing?* (Chapter 1) addresses: The Power of the Body; Homeostasis; The Power of the Mind; Guided Imagery; Meditation; Shamanism; Hypnosis; Biofeedback; The Power of the Spirit. The reader will do well to give thoughtful consideration to these topics in the light of Spiritualism and Andrew Taylor Still, the founder of Osteopathy. Overviews of the various osteopathic manipulative methods are provided. This prepares the way for the author's development of energetically based *Dynamic Strain-Vector Release*.

The ultimate vision of the author's journey seeks to lead to Transformational Medicine. As Osteopathy in its early definition sought to emphasize the triune person, Transformational Medicine seeks to facilitate individual and collective processes of growth in all aspects of being—spiritual, emotional, mental, physical.

NeuroFascial Release Course Videos and DVDs

Stephen Myles Davidson, DO

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This series of four (4) DVDs covers the following topics: Basic Spinal Manipulation (Using Inherent Body Forces); NeuroFascial Release; Visceral Manipulation (Davidson) and Fascia—Form and Function (Malina). The NeuroFascial Release paradigm assumes appropriate medical evaluation and treatment. The incorporation of Osteopathic Manipulative Treatment follows the individual's fullest health potential. As is true of other significant and successful methods (Counterstrain, Cranial Concept), a physiological mechanism is fashioned into a therapeutic tool. Given the orientation of the paradigm, the teaching process via DVDs represents a challenge very successfully met by the producer. In the format of a classroom lecture, introductory explanations of application through osteopathic principles is accomplished in a very clear and succinct manner. The use of anatomical illustrations, skeletons and patients is effectively managed through labeling, animation and practical demonstration. Careful attention has been given to visual effect and clarity throughout this series.

NeuroFascial Release has been developed and taught over several years. The present project of explanation via visual means has also been a long, ongoing project. It is the mature practitioner of osteopathic manipulative interventions who will benefit most from the study of this series of DVDs. That practitioner will more readily appreciate application to a host of commonly and frequently encountered clinical situations. A minimal list of such might include: acute and chronic somatic dysfunctions; intraosseous strains; constitutional fascial patterns; toxic imprinted patterns; subconscious effects. The use of neurofascial release procedures can act rapidly to normalize structural/functional body relationships. A direct palpatory communication seeks the inherent healing response to intention. The manner in which this concept is presented visually is quite effective in facilitating the observer's grasp of this idea. As is true of many previous successful methods, a Glossary of terms and concepts has been developed to describe, discuss and apply the neurofascial release principles.



Dove, A. Putting Potency Before Politics

The New York Stem Cell Foundation (NYSCF) held its first Translational Research Conference on October 23-24 at Rockefeller University. This meeting provided the first update on the current legal landscape of stem cell science since President George W. Bush announced his policy decision for stem cell research in 2001. "For two presentation-intensive days, scientists from around the world discussed the most recent findings in the most promising research areas: somatic cell nuclear transfer (SCNT), diabetes, heart disease, cancer and neurology." **Harold Varmus** (Sloan-Kettering Institute for Cancer Research), one of the conference chairs, noted "These technologies lead to results that already both overturn long-held dogma in the field and present a number of incredibly complicated issues." **Alison Murdoch** (International Centre for Life, Newcastle-upon-Tyne), commented "It's complicated, the science, and I think we sometimes give the impression to laypeople that it's easier than it is." Murdoch and colleagues have derived human blastocysts after transferring somatic cell nuclei into donated oocytes. Doug Melton (Harvard Stem Cell Institute) focuses on solid organ development of regulation in type I diabetes. Considerations by other investigators include treatment of Parkinson's disease and heart disease.

Update. The New York Academy of Sciences Magazine, March-April 2007: 6-9

Strauss, MB; Miller, SS. Diabetic Foot Problems: Keys to Effective, Aggressive Prevention

The authors begin by acknowledging that diabetic foot wounds are the leading cause of lower extremity amputations in the United States. They point out, however, that implementation of effective preventive measures can help avoid many such wounds. They suggest four key components of an effective strategy for prevention of diabetic foot wounds: patient education, proper care of skin and nails, appropriate footwear, proactive surgeries (to correct deformities). *Gait management* occupies a significant place in their management recommendations. Foot deformities (inversion, hyperpronation, splaying of the forefeet, heel tilting) are seen to be associated with abnormal gait patterns. Problems can be magnified with partial foot amputations. Correction of gait patterns can be accomplished through the use of inserts, shoe wedges, lifts, molded plastic ankle-foot orthoses (AFOs), and double upright (Klenzak) braces. Limiting of ambulation is another option. The primary care physician should be involved in teaching patients with diabetes to examine their feet on a daily basis. This will help facilitate proactive recognition of redness, swelling, blisters, calluses and macerated areas.

Consultant. March 2007, Vol. 47 No. 3; 245-252

AlKofide, EA; AlNamankani, E. The Association Between Posture of the Head and Malocclusion in Saudi Subjects.

The authors examined the relationship between head and neck posture and certain malocclusal problems. Dental models and lateral cephalometric radiographs were taken in "the natural head position" of 180 male and female subjects. The postural angles measured between the head and cervical column were termed: craniovertical; craniocervical; cervicohorizontal. Measurement of cervical curvature was included. Malocclusal traits included: molar relation; crowding; spaces; overbite; overjet; crossbites; midline displacements. Significant differences were found in craniocervical and cervicohorizontal angles in subjects with overbite. Gender influence on overbite and head posture was also found to be strongly correlated. Class II malocclusion was found to have a stronger relation with craniovertical and cervicohorizontal angles. Irrespective of gender or age, significant correlation was found between craniovertical angles and overjet. Crossbite was strongly correlated with all craniocervical angles. Since this study involved Saudi subjects, the means for postural variables were different from those previously reported for European subjects.

The Journal of Craniomandibular Practice. April 2007, Vol. 25, No. 2; 98-105



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