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Osteopathic manual medicine for vertigo: review of literature, case report, and future research...

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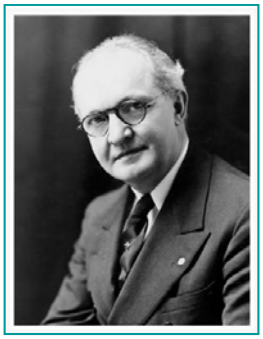

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The mission of the American Academy of Osteopathy® is to teach, advocate, and research the science, art and philosophy of osteopathic medicine, emphasizing the integration of osteopathic principles, practices and manipulative treatment in patient care.

IN THIS ISSUE:

EDITORIAL

REGULAR FEATURES:

ORIGINAL CONTRIBUTIONS

CASE STUDY

Contributors

Luc Peeters, DO-MROB, BSc.Ost.Med., and Grégoire Lason, DO-MROB, BSc.Ost.Med. "Osteopathic Approach to the Spleen." These authors present an interesting discussion of the spleen from an osteopathic point of view. Their article includes a discussion of the anatomy and physiology of the spleen as well as a reminder of common clinical problems associated with the spleen. Splenic congestion is discussed in detail, along with a presentation of osteopathic manipulative techniques for this particular clinical problem.

Marcel Fraix, DO, FABPMR. "Osteopathic manual medicine for vertigo: review of literature, case report, and future research." Dr. Fraix presents a case study and discussion of vertigo, including differential diagnosis and osteopathic approaches. In particular he presents a focused discussion on Benign Paroxysmal Positional Vertigo (BPPV), some manual methods useful in treating this condition, and a discussion of his current and proposed research in this area.

Rebecca E. Giusti, DO. "A Retrospective Study of decreased workers' compensation claims and cost at Downey Regional Medical Center secondary to the free Osteopathic Manipulative Medicine Resident Clinic for employees." This article is the result of Dr. Giusti's research during her NMM/OMM Plus-One residency year. Her data show that the use of OMM can be effective in improving recovery from, and lowering the cost of, care of worker's compensation injuries in a hospital environment.

Matthew Kozminski, DO. "OMT as an adjunct therapy for post-traumatic headache in U.S. Soldiers: A case series." This author presents a case study and interesting data on the use of OMT in a military setting. He shows the useful benefits of OMT as an adjunctive treatment in addition to traditional pharmacological therapies for soldiers suffering from post-traumatic headache attributed to mild head injury.

Regular Features:

Dig On. "Scapular glide: Functional relationships, dysfunction and treatment." Daniel J. Kary DO, FAAO, presents some of his insights and practice observations regarding somatic dysfunction of the scapulae and clavicles. Typical presentations of dysfunctions are discussed, and a method of evaluation and treatment involving levator scapula, rhomboids, trapezius, serratus anterior and ligamentum nuchae is presented.

From the archives. In this issue we present an excerpt from A. G. Hildreth's book, *The Lengthening Shadow of Dr. Andrew Taylor Still*. Specifically, we present a section from Chapter XXIX, in which Harry Chiiles, DO reminisces about Doctor Still. Enjoy these insights into Dr. Still's personality and teaching methods.

View From the Pyramids

Andrew Taylor Still and Osteopathy in the Cranial Field: How much did he know and when did he know it?

Raymond J. Hruby

For most of my career I have wondered just how much Dr. Still knew about what we now refer to as "Osteopathy in the Cranial Field", or OCF. He doesn't really discuss it as such in his writings, although he gave a few hints from time to time. For example, he made references to the brain as being a kind of "battery" that organizes and controls everything else in the body. As an intern, I read Still's books for the first time. I guess I became fascinated with this idea when I read the following quote one night around 2:00 or 3:00 AM while I was on house call: "The cerebrospinal fluid is the highest known element that is contained in the human body, and unless the brain furnishes this fluid in abundance, a disabled condition of the body will remain. He who is able to reason will see that this great river of life must be tapped and the withering fields irrigated at once, or the harvest of health be forever lost."[1]

Over the years, I entertained theories as to why Still never said too much about OCF. My main hypothesis is that he was relatively silent on this topic because he had enough trouble explaining osteopathy in general to the people of his time, let alone trying to get anyone to understand OCF.

All of this leads me to another osteopathic story I would like to relate. In 1989 or 1990, (I don't actually remember which year anymore!) I was given the honor of being the program chair for the AAO Convocation. Among other topics, I asked Alan Becker, DO to give a presentation about William Garner Sutherland, DO. In particular, I wanted him to talk about how Sutherland thought, and how he came to develop the concept and practice of OCF using the science and technology of his time. Dr. Becker related the following story, one which I had never heard before:

> When your program chairman asked me to speak to this assembly he specifically said. "I want you to tell us about the real Will Sutherland. You, unlike many of us had the advantage of actually knowing the man and studying with him. Tell us how he thought."
>
> This request posed a real challenge. For many years there has been a Sutherland Memorial Lecture given at the Convocation of the American Academy of Osteopathy. There are several others in this profession who are better qualified than I to give this lecture; my brother, Rollin Becker, DO and Anne Wales, DO to name only two. [*Editor's note: By this time, both Rollin and Anne were unable to travel to Convocation because of health reasons.*] However, I was the one chosen so I will attempt the task of delineating the "real" Will Sutherland…
>
> …It was during the two years (that was the course in Kirksville at that time) that Will Sutherland began the course of study that would occupy him the rest of his life. He had already recognized the incredible possibilities in the new science of osteopathy and was determined to make the most of them. Much has been written about the occasion when, while looking at a skull, he noted the beveling on the superior edge of the temporal bone and the thought came, "beveled like the gills of a fish, indicating a provision for respiratory motion." Let me supplement this with a story Will himself told. "I asked Doctor Still why the skull bones were grooved, some internally and some externally. Dr. Still put his hands on my shoulders and answered, 'You are the first student ever smart enough to ask me that. Now think! Why would they be?" I asked, 'could it be for motion?" Doctor Still's answer has remained with me all my life: "Bill, if the bones of the skull couldn't move what do you think the brain would do? When you breathe in the skull has to enlarge and when you exhale it gets smaller because the fluids go up into the brain when you inhale and go down and out when you exhale. Now you go ahead and dig this out!"

When Dr. Becker finished telling this story, the room had become so quiet one could have heard the proverbial pin drop. I believe it was the first and only time in my life I ever saw a large audience undergo a collective Still Point. It was at that moment when I became more convinced than ever that Still must have known more about OCF than he ever expressed. In fact, I think he knew a lot about OCF. He knew a lot about a lot of things.

1. Still A T. *Osteopathy: Reseach and Practice*. Kirksville. 1898:360.

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Dig On:

Scapular Glide: Functional relationships, dysfunction and treatment

Daniel J. Kary

Abstract: This article is presented as an aid in developing more accurate diagnosis and effective osteopathic treatment of somatic dysfunction involving the scapulae and clavicles. This is facilitated by a clear understanding of normal structure and function. Scapular anatomy, attachments, innervation, action and functional relationships of muscles which affect scapular and clavicular movements, are reviewed. Typical presentations of dysfunctions are discussed; and a method of evaluation and treatment involving levator scapula, rhomboids, trapezius, serratus anterior and ligamentum nuchae is presented.

A more complete understanding of the muscles, which move the scapula, enables better identification and treatment of scapular dysfunction. Tenderness at muscle attachments helps confirm impressions formed by objective findings. Improved specificity during treatment leads to more effective and predictable treatment outcomes.

Introduction:

Though common, scapular dysfunction is not always recognized as such. Its causes include injury, overuse, degeneration and disease. Due to muscle and fascial relationships, scapular dysfunction often involves distant complaints and associated objective findings. Treatment outcomes are improved when the structural and functional interrelationships with the head, neck, thorax and ribs are also considered.

Vague knowledge of functional anatomy may cloud recognition of scapular or clavicular involvement; leading to increased cost of care, unnecessary diagnostic studies and treatment, delayed recovery and productivity loss.

Dr Still wrote: “the word 'treat' has but one meaning- that is to know you are right and do your work accordingly.” As knowledge of normal scapular and clavicular function grows, improved confidence and specificity of treatment follows. When interrelated elements are brought into a balanced state, the body’s inherent physiologic ability for normal control is improved.

The scapula as a functional joint

Gray’s Anatomy states that **“**scapular motions on the thoracic wall are facilitated by areolar tissue between subscapularis, serratus anterior and the chest wall.” Considering the scapula as having a *functional joint* between it and the chest wall, facilitates treatment based on osteopathic principles. The scapulothoracic interface allows multidirectional translational glide. That motion is limited by elasticity of attached muscles and clavicular ligaments.

Normal scapular and clavicular motions

The scapulae and clavicles move in concert due to ligamentous and fascial connections. The clavipectoral fascia attaches broadly to clavicle and scapula, linking them superiorly, and laterally along the lateral scapular border where it forms the axillary roof. Scapular motion *always* produces *opposite* sternoclavicular joint motion. Scapular elevation causes the clavicle to translate downward over its articular disk. Depression causes an upward translation. The combined glenohumeral and clavicular joint motion allows up to 180° of flexion and 40° of extension. A meniscal cartilage in the sternoclavicular joint facilitates *translation* over a wide range of motion. Thieme describes 40° of clavicular elevation, 10° of depression, 45° of circumduction (spherical motion) and 30° of axial rotation. *Gray’s Anatomy* describes 60° of clavicle “elevation.” The capsule at the acromioclavicular joint allows significant swiveling and twisting motions. *Any limitation of sternoclavicular joint movement will limit scapular glide.*

Scapular motions include: *elevation and depression* via craniocaudad translation, *protraction and retraction* via abduction and adduction, and *lateral and medial rotation* of the inferior angle. Rotation between arm and scapula occurs in a 2:1 ratio. If the humerus rotates 120°, the scapula rotates 60°. In full lateral rotation the glenohumeral joint faces vertically. Even if the glenohumeral joint were completely ankylosed, one third of normal arm flexion and abduction could still occur.

Evaluation and overview of scapular and clavicular motion and dysfunction

Dr. Still stressed the need to understand the form and function of anatomy. Scapular evaluation should include observation of position, movements and palpation. Observation may then be broadened to include awareness of intrinsic motions and more distant functional relationships.

Retraction is due to action of middle trapezius or rhomboids. *Protraction* is due to action of serratus anterior, pectoralis major and pectoralis minor. *Elevation* is due to action of levator scapula, upper trapezius and rhomboids. *Lateral rotation* is due to action of upper trapezius, which attaches to occiput, ligamentum nuchae and posteriorly along the lateral third of clavicle. It is assisted by the strong inferior portion of serratus anterior, which attaches to the inferior scapular angle. The scapula may also become elevated and laterally rotated by sternocleidomas-

toid acting on the clavicle as occurs in torticollis, and by action of the omohyoid. *Depression and Medial rotation* are caused by actions of the lower trapezius and latissimus dorsi.

In general, dysfunction of any muscle may also restrict motion of an opposing muscle; for example, scapular elevation may be restricted by dysfunction of latissimus dorsi, lower portions of trapezius and pectoralis major or minor. Similarly, limited internal rotation of the arm may be due to dysfunction involving the lower trapezius, which causes restricted protraction of the scapula.

Tenderness at muscle attachments aids in determining areas of myofascial dysfunction. Attachments of dysfunctional scapular muscles may appear to be segmental articular dysfunctions. However, if treated as such, and the scapular involvement is overlooked, the dysfunction often returns. When dysfunction involves a muscle, treating both ends and its middle is helpful; taking the whole muscle and its attachments into ease simultaneously. If accessible, one may utilize the muscle's boney attachments or capsular sheath as contacts.

Intrinsic and extrinsic muscles

Intrinsic back muscles lie deep to the thoracolumbar fascia. These muscles develop in situ, are innervated by branches of the dorsal rami of spinal nerves and are considered "true" back muscles.

Extrinsic back muscles are more superficial "immigrant" muscles. In contrast to the intrinsic back muscles these migrate from head and ventral origins during development and are innervated by ventral rami. Trapezius, levator scapula, rhomboids, serratus anterior, and latissimus dorsi are all extrinsic muscles.

Primary Scapular Glide Muscles of the shoulder girdle: Attachments, action, innervation and dysfunction

Levator scapula: *Attachments:* Superiorly, by tendinous slips to transverse processes of C1 and C2, and to posterior tubercles of C3 and C4, and inferiorly, to the medial scapular border between superior angle and medial end of the scapular spine. *Action:* Elevation of scapula, often in concert with upper trapezius. *Innervation:* Superiorly by branches of the 3rd and 4th cervical nerves and inferiorly by a branch of the 5th via the dorsal scapular nerve. *Dysfunction:* Scapular elevation, pain and tenderness at ipsilateral C1-4 vertebral attachments and proximal to, or at the superior scapular angle. *The C1-4 attachments often create a group dysfunction which is extended, rotated and side-bent ipsilaterally. This is often confused with upper trapezius* (which has distinctly different attachments) *or considered as unrelated upper cervical dysfunction. Causes:* Prolonged overhead reaching, deceleration injuries to the neck, prolonged scapular elevation, and active neck extension under load.

Rhomboid minor: The rhomboids are deep to the trapezius. *Attachment*s: From lower-most ligamentum nuchae, C7 and T1 spinous processes and the medial end of scapular spine. Its ventral layer shares fascia, which is tightly fused with that of the fascial attachments of the upper serratus anterior. *Action*: Retracts, elevates and externally rotates the scapula. *Innervation:* C4 and C5 nerves, via a branch of the dorsal scapular nerve. *Dysfunction*: C7 and T1 are rotated toward the opposite side, (spinous processes approximate the affected scapular border), with restricted scapular protraction, inter-scapular and lower neck pain and tenderness at its attachments. *Causes:* Rhomboid minor resisting scapular protraction; as during acceleration injury in a rear end auto collision with one's hands gripping the steering wheel, causing abrupt shoulder protraction. It may also be caused by a vigorous scapular retraction by the rhomboid minor, as while starting a lawn mower by a pull cord.

Rhomboid major: *Attachments*: T2-T5 spinous processes, supraspinous ligaments and along medial scapular border between the scapular spine and inferior angle. *Action*: Elevates and retracts scapula. *Innervation:* Same as rhomboid minor. *Dysfunction:* T2-T5 rotated to opposite side, restricted scapular protraction and tenderness at attachments. Symptoms include upper back, lower neck and interscapular pain. These symptoms usually increase with neck flexion or rotation. *Causes:* Resisted scapular protraction (eccentric contraction) and repetitive or forceful retraction, similar to rhomboid minor.

Serratus anterior: The serratus anterior is a prime mover in *all* reaching and pushing movements. It has *three separate scapular attachments and three distinct actions*. Protraction, which involves pushing, thrusting and reaching, often includes some lateral motion. During scapular protraction the lateral clavicle moves forward until reaching the limit of its capsular motion at acromion, while its sternal end translates backward, carrying the disc with it. *Full scapular protraction requires normal clavicular motion.* The serratus anterior and pectoralis minor muscles work in concert to maintain continuous apposition of the medial scapular border against the thorax. During protraction the latissimus dorsi acts like a strap over the inferior scapular angle, further stabilizing the scapula against the thorax.

Attachments: Serratus anterior arises from extensive costal attachments to the outer surfaces and superior borders of the upper 8 to 10 ribs and their intercostal fascial coverings. It curves around the thorax as a large muscular sheet, passes deep to the scapula and attaches by three separate insertions to the medial scapular border.

The *upper serratus* attaches from ribs 1 and 2, by a single digitation, to the superior angle of the scapula at its dorsal and costal surfaces. Other serratus slips attach

separately to individual ribs. The *middle serratus* attaches from the next lower 3 or 4 ribs and along the medial scapular border. The *lower serratus* attaches from the next lower 3 or 4 ribs, and by a strong conjoined attachment, to the inferior scapular angle. Its heavy lower insertion at the inferior scapular angle provides essential assistance to the upper trapezius during external rotation and overhead reaches.

Action: All three attachments cause protraction and are involved in reaching motions. The *upper portion* works with pectoralis minor when reaching forward and downward. The *middle portion* is active when reaching or pushing forward. The *lower portion* is a powerful external rotator of the scapula and is engaged when reaching or pushing the arm overhead, especially against a load. It assists the upper trapezius. When treating the serratus it is important to visualize each scapular attachment and the associated rib attachments and direct treatment accordingly.

Innervation: By the long thoracic nerve (C-5). Nerve damage may cause scapular winging and may occur following an overstretching injury.

Dysfunction of serratus anterior: Anterolateral rib pain, guarding and, pain limited, ability to protract the scapula or lift arm overhead. It may also limit retraction. Pain and tenderness are found at the affected attachments. The inferior muscle attachments are easily palpated at the inferior scapular angle when the scapula is rotated laterally by arm flexion. Lower serratus anterior rib attachments are easily palpated along the posterior axillary line ranging from the 6^{th} to 10^{th} ribs. The rib attachments of the upper serratus (1^{st} and 2^{nd} ribs) may be palpated just medial to the coracoid process. The slips from the middle portion (3^{rd} to 5^{th} or 6^{th} ribs) may be palpated in and just inferior to the axilla, posterior to the anterior axillary fold. Causes include rib fractures, vigorous pushing during reaches or falling onto outstretched hands. The arm position during resisted retraction is a key to which portion of the serratus anterior, a protraction muscle, is affected. Falling onto buttocks or back, with hands braced behind to break the impact or landing backward onto elbows, may cause dysfunction of the inferior portion of serratus anterior. A forward fall onto outstretched hands may cause dysfunction of the middle portion of serratus anterior, and catching a heavy object or an abrupt load onto arms while reaching overhead, may also affect the inferior serratus anterior. *Either eccentric or concentric contraction of a muscle may cause dysfunction either of that muscle or of its antagonist, depending on direction of force.* In such cases, dysfunction involves the muscle which is abruptly stretched within its physiologic capabilities. Stretching beyond anatomic barriers may cause structural failure as well as dysfunction.

Trapezius: Like the serratus anterior, the trapezius has three distinct and functionally different attachments, each with separate actions.

Attachments: occipital attachments by a fibrous lamina, *which adheres to skin,* to occipital protuberance, the adjacent medial third of superior nuchal line, along ligamentum nuchae from occiput to C7, and from C7 to T12 at the apices of spinous processes and to supraspinous ligaments. Its fibers converge on the shoulder and are divided into three parts. *Superior fibers* attach to the posterior border of lateral third of clavicle, to the head from occipital protuberance, to scalp, middle third of superior nuchal line and to ligamentum nuchae along the cervical midline. *Middle fibers*: attach to medial acromion, superior lip of scapular spine and spinous processes of T1-6 or 7. *Inferior fibers:* attach to T6 or 7- T12 spinous processes and converge to a tubercle on the medial end of the scapular spine, attaching by an aponeurosis. *Innervation:* accessory nerve.

*Action***:** The upper portion of trapezius elevates and laterally rotates the scapula, the middle retracts the scapula and the inferior portion depresses and medially rotates the scapula. Latissimus dorsi can also depress and medially rotate the scapula. It attaches to upper humerus, the inferior-lateral corner of scapula (variable), T-spine, lower ribs and by aponeurosis to the sacrum.

Upper trapezius dysfunction is associated with tenderness over the posterolateral clavicle, occiput and sometimes the entire posterior cervical midline, with lateral upper shoulder, occipital and cervical pain. The scapula may be externally rotated, as the upper trapezius is an important scapular rotator. It works in concert with levator scapula, rhomboids, lower serratus anterior and pectoralis major to create a variety of motions, which include retraction, bracing, elevation and depression. When the scapula is fixed, it tips the neck. Upper trapezius dysfunction may be caused by antalgic guarding of shoulder, neck, arm or ribs, deceleration or lateral acceleration.

Middle trapezius dysfunction is associated with tenderness along the superior border of the scapular spine, along medial acromion and along the lateral margins of the upper 6- 7 thoracic spinous processes.

Lower trapezius dysfunction may cause depression and internal rotation of scapula, as well as rotation and sidebending of the thoracic spine. Tenderness may be elicited at its attachment at the medial end of the scapular spine and from lateral aspect of T6-12 spinous processes.

Pectoralis major causes depression and some internal rotation of scapula. It is considered a shoulder joint muscle.

Subclavius attaches to 1^{st} rib and clavicle. At times it may attach to manubrium or to coracoid process of scap-

ula. It is thought to brace the clavicle against the sternoclavicular articular disc.

Treatment: *When treating the scapula review anatomy if needed*. Monitor the motion of the intrinsic mechanism if possible. Restoration of intrinsic motion or an appropriate release indicates the treatment endpoint.

Sternoclavicular dysfunction: *Any sternoclavicular joint restriction limits scapular motion*. Clavicular dysfunction should be treated prior to treating the scapula. The opposite motion of each end of the clavicle may be utilized to advantage when treating the sternoclavicular joint. Treatment may be done in several positions and by a variety of techniques; two are presented.

Articulation: (beginning indirect and ending direct) If the sternoclavicular end were found to be depressed and remained restricted in that position, indirect articulation could be used to first "unlatch" the restriction, followed by direct action to free the restriction. One hand is used to grasp the wrist; while the other hand assists in the desired sternoclavicular motion. This is done in two steps. 1: Maintain axial distraction through the arm and elevate the lateral clavicle while the opposite hand exaggerates opposite motion of the medial clavicle. 2: While maintaining traction, the arm and clavicle articulation is reversed. This carries the lateral clavicle into depression, while introducing a slight medial elevation with the opposite hand. This articulates the medial clavicle, its capsule and meniscus. This may be done in other positions. Treatment is reversed for sternoclavicular elevation restrictions and may also be used for antero-posterior dysfunctions.

Balanced ligamentous tension: (either direct or indirect) Dr. Sutherland's technique, as described by Dr. Howard Lippincott, utilizes balanced ligamentous tension to lift and balance both ends of clavicle simultaneously. The ligamentous articular strain may be balanced with the patient seated or supine.

Levator scapula: (indirect) Seated, at head of supine patient: use chest or shoulder to introduce slight axial compression to the head, while drawing the affected scapula craniad. Direct the compression in line with the levator scapula. Monitor for release.

Rhomboids*:* (indirect) Seated, at side of supine patient, with posterior hand across spinous processes: use fingertips to draw spinous processes toward scapula, in line with rhomboid fibers. Monitor for release and restoration of function.

Serratus anterior*:* (indirect) Seated, at side of supine patient: use posterior hand to abduct and protract scapula into its ease with the serratus segment being treated. Align anterior hand with associated ribs to sequentially engage affected segments as close to serratus origin as possible. Consider the three different attachments of the upper, middle and lower functional groups. Direct each group into its ease with its specific attachments and monitor for improvement. Access the single upper segment anteriorly and the middle portions in the axilla. The inferior segments, which attach to the inferior scapular angle, are best treated with the patient's arm flexed.

Upper trapezius: (indirect) Seated, at head of supine patient. Use one hand to rotate the scapula externally and hold the patient's arm into flexion, and use the other hand to draw the occipital attachments inferolaterally toward the ipsilateral clavicular attachment. *As the muscle is adherent to the skin at the nuchal line, a gentle traction on overlying hair may be used effectively*. Monitor for release.

Middle trapezius: (indirect) Seated, at side of supine patient. Draw the upper 4 to 6 thoracic spinous processes toward the scapular spine of the affected side. Monitor for release.

Inferior trapezius: (indirect) Seated, at side of supine patient, side-bend the spine toward the affected side. Depress the scapula toward T8 or T9 (mid way between T6 and T12) while drawing the spinous processes between T6 and T12 toward the scapular muscle attachment, at the medial end of the scapular spine. Monitor for release. Inferior trapezius dysfunction may limit full internal rotation of arm by limiting protraction.

Ligamentum nuchae: (direct) Ligamentum nuchae should be treated along with upper trapezius, and when involvement is suspected. When tensed, it may cause hyperlordosis of C-spine, which interferes with elongation of neck and chin retraction. *Treatment:* support and gently lift the occiput with superior hand to flex the neck. Stretch the skin along posterior cervical mid-line dorsally and caudally while providing a gentle stretch first from the mid cervical level and then from the C7 level. Continue gentle neck flexion while stretching. *Do not force*.

Omohyoid: Though not considered a primary scapular muscle, it may cause persistent pain at its scapular attachment. Its superior belly attaches to the lower border of the body of the hyoid. Its inferior belly attaches near the scapular notch, or to the superior transverse scapular ligament. It may also attach directly to the clavicle. It may be treated indirectly by carrying the scapula into external rotation and crossing the ipsilateral arm toward the opposite shoulder. This may be augmented by moving the arm and scapula into abduction to complete the treatment by direct action.

Continued on page 29

Letters to the Editor

Osteopathic Manipulative Management in Sudden Infant Death Syndrome

The following comments are in response to numerous articles written and published about the supine recumbent position of newborns as related to Sudden Infant Death Syndrome (SIDS).

Kathleen Fackelman of the *U.S.A. Today* newspaper wrote one article in November of 2006. Another article followed stating that 60% fewer newborns had died of SIDS since the supine posture was adopted for newborns.

In 1976, the osteopathic medical staff of the Waterville Osteopathic Hospital (now, Inland Hospital) in Waterville, Maine, unanimously approved the addition of the evaluation and treatment of the cranio-sacral system along with the required structural evaluation and treatment of all newborns. When, on evaluation, motion dysfunctions were found, gentle, subtle, osteopathic techniques were used by an osteopathic physician to reestablish normal structural and craniosacral motion. The assessment and treatment was performed on newborns who were predominantly kept in the prone posture at that time.

Between the years 1976 and 1985, no hospitalized SIDS was reported, and only one hospitalized SIDS occurred from 1985 to the present (2009).

A well-trained and experienced osteopathic physician performs evaluation and osteopathic treatment of the craniosacral system. Part of the diagnosis treatment involves the palpation of the spheno-occipital motion of the cranium and the fascial membrane components.

Deep to the occipital bone lies the medulla and pons portion of the brain stem where the controlling nuclei for respiration and cardiac function are located, Also included, among other important nuclei, are the neurotransmitter chemical pathways for these nuclei to the rest of the brain.

The supine posture of the newborn has been likened to freeing the respiratory system, thus improving respiratory activity. However, I believe the supine posture is also significant because the weight of the head is placed on the occipital bone. This position is a natural position to help mobilize the occipital bone motion by the weight of the head and, therefore, helping to physiologically normalize the medullary nuclei functions, i.e. respiratory and cardiac functions.

The supine posture is valid in improving SIDS. The lack of 40% improvement may be due to neural deficits as Kathleen Fackelman states in her article. However, I wonder if appropriate cranial osteopathy were applied to the 40% group, would it further decrease SIDS? For example, some newborns cannot mobilize the craniosacral dysfunctions on their own in the supine posture.

I suggest, therefore, that one of the tests for the evaluation of potential SIDS in the newborn should be the assessment (in its entirety) of the craniosacral system as part of the total required structural osteopathic examination and appropriate treatment if dysfunction is found.

Several criteria can be used to assess and treat the above dysfunctions:

1. There is no dysfunction of the cranio-sacral System and SIDS, therefore, is potentially decreased. (10% of newborns may not have cranial dysfunction.)
2. The newborns mobilize the dysfunctions by themselves in the supine position by the weight of their heads, reestablishing normal occipital bone and brain stem functions. Consequently, SIDS is less likely to occur.
3. The newborn craniosacral dysfunctions are found and competently treated with no return of the dysfunctions on repeat examination. SIDS potential is diminished.
4. Motion dysfunction is found by the DO and appropriately treated. Upon further examination, the dysfunction returns, as a red flag, and further investigation is necessary to determine the extent of neurological or other dysfunctions.

Evidence of minimal to no SIDS after 33 years by the Waterville Osteopathic Hospital experience indicates that SIDS has been markedly reduced by the structural Osteopathic evaluation, including cranio osteopathic evaluation and treatment of all newborns.

Further investigation of these comments should be performed.

Richard C. MacDonald, DO April 25, 2009

Thanks and Good job

Ray, I have just read the March edition of *The AAO Journal*. Your "View From the Pyramids" about "osteopathic stories" was excellent and instructive. Especially your closing paragraphs where you described the applied anatomy related to Dr. Still's conundrum intrigued me. That is the way Angus Cathie taught anatomy at PCOM when I was there. Regional and immediate anatomical relations were the vehicle for his teaching and had to be the warp and woof of our responses to his questions both in lecture hall and in the lab. That kind of thinking established immediate and distant relationships firmly in our minds permitting us to think through a symptom in specific and broad anatomical terms before we jumped to some "medical" diagnosis. Thanks for the flashback.

Jamie Lipton's article dealt with a topic near to the core of osteopathic practice - the whole patient. Any change induced in the posture of the standing patient may cause physical, neurological and vascular changes that can be brought about in no other way. I hope Jamie will continue to collect patients to increase his "n".

I have written Jamie suggesting just that. Additionally, I have recommended a follow-up study of the patients already treated. A large percentage of them will discontinue the lift treatment within two to three years and many of that group will experience return of their symptoms. They will provide the last element of Jamie's study - the fulfillment of Koch's postulate - the untreatment phase and return of symptoms. I saw this time and time again in practice. It is a common human failing that no amount of counseling at the time of initial treatment can prevent. Over a 20-year span, I have seen patients go through the cycle several times - they never learn! I thought that I did.

You are brave to take over the reins again and, like osteopathic stories...you are priceless.

CHEERS!
David A. Patriquin, DO, FAAO

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November 1-3, 2009	AAO Program at the AOA Convention	New Orleans, LA
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From the Archives

FROM: Chapter XXIX, "Some Anecdotes of the Old Doctor", in: Hildreth, AG: *The Lengthening Shadow of Dr. Andrew Taylor Still.* Kirksville: The Journal Printing Company, 1938, pp. 436 – 441.

I was in close contact with the Old Doctor quite frequently, as I worked in the office of *The Journal of Osteopathy* during my last year in college, and he took quite an interest in that publication. Dr. Still talked quite freely at times of his theories and of what he expected the osteopathic profession to do. No one of us since has ever thought as deeply as Dr. Still thought. No one of us has had the imagination and followed through with work to prove or disprove theories as Dr. Still did. It was the use of his intellect coupled with a will to work that made him great, for Dr. Still's life, above all things, was practical. He had the power of relaxation such as I have never known. The sensitiveness of his soul heard the guns and saw the ships afire at Manila Bay and at Santiago, Cuba, and he told that great battles were going on a day or two before the wires brought news to us. Then there may have been a doubt of this power, but radio now does it for us obtuse ones, evidently he did not need it. He believed that the mind might be trained to see beneath the surface, as the x-ray does, and may be his mind did this for him in some of his rapid diagnoses. He said to me, "The x-ray by tremendously increasing the vibrations brings to light what is beneath the surface. Why did we not train our minds to do it?" In the light of present-day science, why should it be impossible? Dr. Still's life had taught him to depend on himself and not on outside aids.

It was difficult to follow his hand in some of his diagnoses and treatment. There was no hesitation, for he had a clear picture in his mind of the structures he was working with. None of us had that much knowledge and no one has matched his technic, nor his success. His instructions in technic were often over our heads, but his reasoning, his deductions, and his philosophy were of the greatest value.

One examination I saw him make still impresses me. He was examining a foot and said, *"Begin at the point of pain and follow back, examining each joint until you come to the spine."* Many of us in our zeal for hunting spinal lesions reverse this process. We begin at the spine and, finding tenderness or strain there, go no further and leave a local injury undiscovered. Every case was a different one and presented different problems. He discouraged students from jumping at conclusions and expecting to find a certain condition in one case because they found it in the last case.

Dr. Still was in the classrooms quite frequently the years I was at the American School of Osteopathy. It was a great treat for us underclassmen to sneak in where clinics were being held and demonstrations of technic given. Technic was the thing—classes in manipulation for pay, conducted by students who had taken such work themselves, were quite in vogue, especially for those who wanted to go out before graduation and gain some experience. I still thrill at the memory of my crowding inside the door of old North Hall, and listening to some recent graduate give his experience of battling with a patient stricken with infirmity or disease. I recall the respect we had for such a person. He knew something; he was doing things; and yet that physician had graduated from school only a year or two before.

Perhaps I got the idea from my reaction to these "voices of experience," for I have had the conviction ever since that the student's education would be vastly more practical if the upper classes in our colleges had talks frequently from successful osteo-pathic physicians regarding conditions they are soon to face. Success, usefulness, happiness, are not measured by what we have gotten from textbooks in college, but rather by how applicable we can make our knowledge to the needs of others.

I am reminded here of some of the very practical advice Dr. Still would give us at times. He would urge on us that we were representatives of a new system of healing, new theory of disease, new methods of treatment. He ridiculed the use by us of the instruments of diagnosis in vogue in medical practice. He maintained sick people were sorely tired of existing methods and would make use of us because we were different, and when we produced the same instruments and followed the same methods used on them by medical men so often, they would say, "It's the same old thing—I thought I was getting something different."

He expected us to go out as pioneers in introducing to sick people something they had never used before—and hence give them a new hope. It was good logic in those early days, and it is good logic today, as proved by the fact that those who have thought straight and worked along strictly osteopathic lines have established themselves in successful practices. As long as there are well-established medical men on every corner, ready to do surgery, a half-dozen or more of them to one of us, why should we be so foolish as to go in and attempt openly to compete with them in their acknowledged field and neglect the broad unoccupied areas made tillable and fertile by thirty years of cultivation? Thirty-five years ago there were sufficient people wanting osteopathy to keep occupied the limited number then prac-

ticing it. Today, there are more people wanting osteopathy than formerly because the profession has grown in prestige as well as in numbers.

We should not seek to make the impression that merely because we are different from other schools of medicine that we are better than they are; but the fact that it is different offers some hope to many "who have suffered much of many physicians." Dr. Still was right, proved right by thousands of our number who have stood loyal to his teachings and profited by practicing them.

I marvel yet, as I look back at the versatility of the man, Dr. Still. He knew what was going on in science and in medicine, and his stock of general information was far above what would be expected of one who had lived his strenuous life. His social qualities were remarkable. In gatherings of men and women anywhere Dr. Still was sought out because he was interesting to talk to. His kindly smile, the merry twinkle in his eye, his wit, humor and repartee, his information and common sense made him the central figure in any group. Even outside of Kirksville and where he was not the "Old Doctor" to students and patients, he was the same popular and sought-after man.

In my first few months the students from the Southern states organized to give parties and socials with programs furnished for the most part by their own members. At some of these gatherings Dr. Still would be a guest and enter most heartily into the fun of the evening. I recall one such meeting at which my small children were present (because there was no one at home with whom to leave them). Dr. Still noticed the little girl, and took her around in his arms a great part of the evening. Inaugurating the custom made famous later by the late John D. Rockefeller, he gave her a bright dime which was a family treasure for years. I mention this incident, of course, merely to show the humanism of the man occupied as he was with great responsibilities and cares.

Early in the spring of 1897 the students and faculty of the American School of Osteopathy organized the American Association for the Advancement of Osteopathy. This was a sincere manifestation of the professional instinct looking to fellowship and cooperation. It was most creditable to the students of that early day to take this step. Maybe persecution of osteopathic physicians graduated a year or two before impressed on them the necessity of union for common protection. But their constitution shows plainly that the end in view was the creation of a profession for mutual exchange of experience and common benefit. Be it remembered that the first osteopathic physicians had been graduated less than three years before this organization was formed. This speaks volumes for the conviction, the earnestness, and the alertness of these early graduates and students. To learn more from the experiences of their fellows at professional meetings and to pledge each other comradeship and support in the perils of practice was a noble move.

Maybe we are a little inclined to overlook the ethics of Dr. Still in his determination to teach osteopathy so that others might practice it. He was asked by some to teach them, and he urged others of his acquaintances to take up the study. Nor was there any disposition to prevent the establishment of other schools teaching osteopathy where they gave evidence of giving a competent course of instruction. Osteopathy was for the people and those who could ethically and effectively give it to the people were welcome to it. No one who knew Dr. Still could entertain the thought that he ever considered that he might have made millions by building hospitals and employing men and women whom he instructed to treat those who came to him. The first graduates to go out caught the spirit and were as interested in having men and women enter one of the colleges for study as they were in securing patients for themselves. On the whole a most remarkable and creditable record!

Some of the outstanding gatherings of the profession were held in Kirksville. I recall vividly the notable meeting in 1901 at which our present organization, as a really national or international body was created out of the student organization mentioned above. The name at this meeting was changed to the American Osteopathic Association, and a general form of organization, providing for Board of Trustees and standing committees, and elective officers, was adopted which lasted practically without change for twenty years.

Dr. Still appeared several times before this first meeting, and, of course, mingled freely with those in attendance, many of whom, graduates of other colleges of osteopathy, saw him for the first time. The days of the convention including July 4, brought us intensely hot weather. I can see Dr. Still now standing on the platform one night, making an address, feet encased in carpet slippers, without coat or vest, suspenders most prominent over white shirt, unbuttoned at neck, using a palm leaf fan.

I saw for the first time at that meeting many of the men and women who have become the most prominent in the osteopathic profession. Several of these came to be my closest friends and intimate co-workers in the national association. Wonderful people! To the end of time osteopathy will owe them a debt of gratitude! At this meeting *The Journal of the American Osteopathic Association,* our first official publication, was launched, with the late Dr. A. L. Evans as first editor. Five or six years later the editorship of *The Journal* came into my hands and remained with me fifteen years. Dr. W. F. Link, who knew the printing business, was Chairman of the Publication Committee. And the stalwart, C. M. Turner Hulett, pre-

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Osteopathic approach to the spleen

Luc Peeters and Grégoire Lason

1. Introduction

The spleen is an organ that is all too often neglected in the clinic, most likely because conditions of the spleen do not tend to present a defined clinical picture. Furthermore, it has long been thought that the spleen, like the tonsils, is an organ that is superfluous in the adult.

The spleen is actually the largest lymphoid organ in the body and is implicated within the blood circulation. In the foetus it is an organ involved in haematogenesis while in the adult it produces lymphocytes. The spleen is for the blood what the lymph nodes are for the lymphatic system. The spleen also purifies and filters the blood by removing dead cells and foreign materials out of the circulation

The function of red blood cell reserve is also essential for the maintenance of human activity. Osteopaths often identify splenic congestion under the influence of poor diaphragm function. Some of the symptoms that can be associated with dysfunction of the spleen are:

- Anaemia in children
- Disorders of blood development
- Gingivitis, painful and bleeding gums
- Swollen, painful tongue, dysphagia and glossitis
- Fatigue, hyperirritability and restlessness due to the anaemia
- Vertigo and tinnitus
- Frequent colds and infections due to decreased resistance
- Thrombocytosis
- Tension headaches

The spleen is also considered an important organ by the osteopath as it plays a role in the immunity, the reaction of the circulation and oxygen transport during effort as well as in regulation of the blood pressure.

2.Anatomy

(Dalley and Agur 2004, Gray 2000, Netter 2006)

2.1. Position

The spleen is an organ that is located under the left dome of the diaphragm *(Figure 1*) and is 12 to 15 cm long, 4 to 8 cm wide and 3 to 4 cm thick. The spleen weighs between 140 and 180 grams. It is found between the 9th and 11th left ribs *(Figures 3 and 6)*. In newborns the spleen is small but the volume increases rapidly during the first 3 years to 4 - 6 times the birth size. The position therefore progressively becomes more lateral in place of the original epigastric position. The spleen is found postero-latero-superior from the stomach, its arterial supply is via the splenic artery and the left gastroepiploic artery *(Figure 2)*. The venous drainage is via the splenic vein into the portal vein *(Figure 2)*.

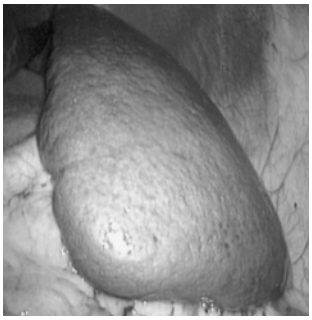

***Figure 1** – The spleen*

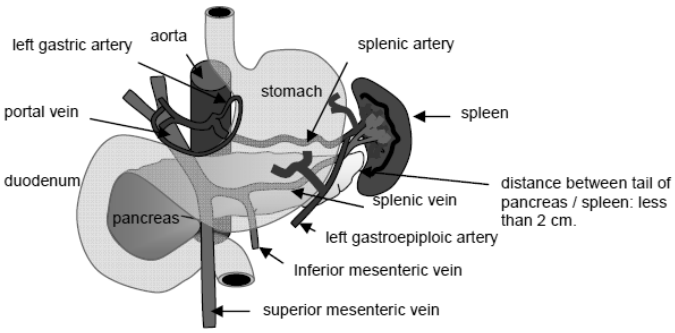

***Figure 2** – Position and vascularisation of the spleen*

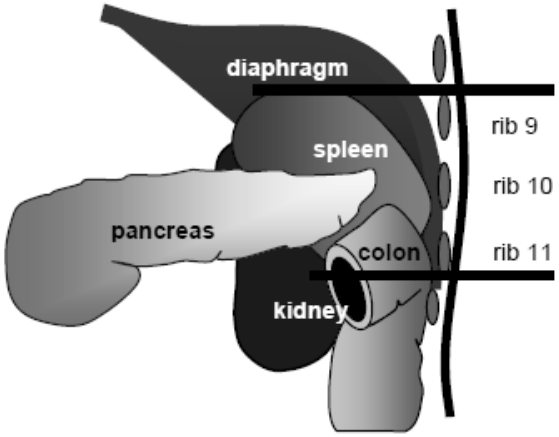

***Figure 3** – Spleen and surrounding organs (the stomach is not shown)*

The spleen contacts the stomach via the gastrosplenic ligament *(Figures 4 and 5)*, the kidney via the splenorenal ligament *(Figures 4 and 5)* and the left colic flexure via the splenocolic ligament.

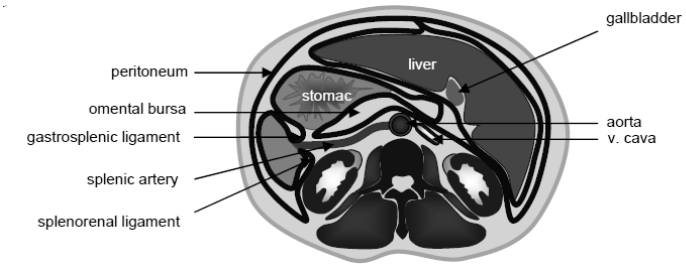

***Figure 4** – Horizontal view of the spleen*

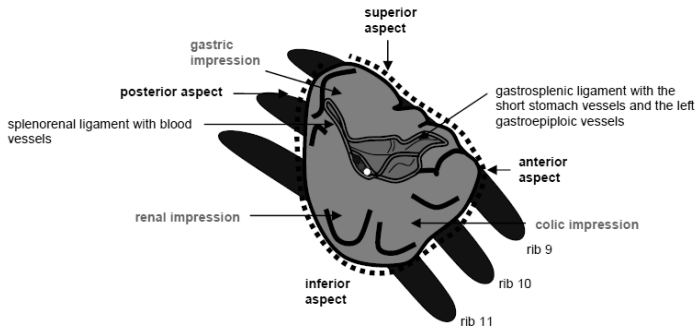

Figure 5 *– Internal view of the spleen and related organs*

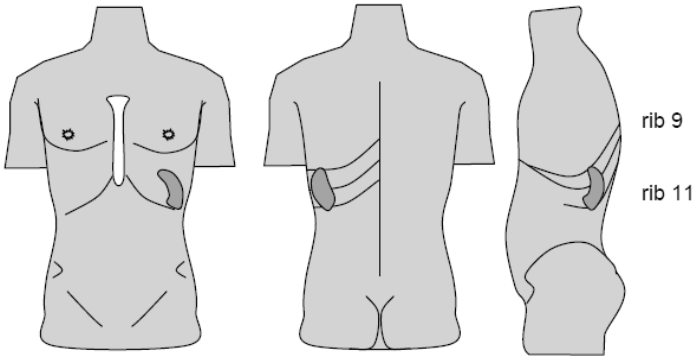

Figure 6 *– Topography of the spleen*

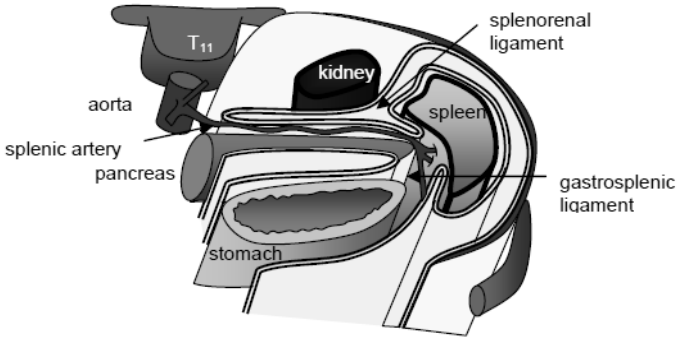

Figure 7 *– Fascial structures around the spleen*

2.2. Anatomical fixations

The spleen is covered by the splenic capsule and is situated in the peritoneum *(Figure 7)*. The organ is maintained in postion by 2 peritoneal folds, the gastrosplenic ligament and the splenorenal ligament, both of which originate from the dorsal mesogastrium.

The anatomical fixations of the spleen are:

1. The most important fixation is the phrenocolic ligament, which links the left colic angle to the left wall of the body. This ligament forms the floor sustaining the spleen.
2. The short gastric vessels (a. and v. gastrica brevis) and the left a. and v. gastroepiploica are situated in the gastrosplenic ligament.
3. The vessels for the spleen (a. and v. splenica) are situated in the phrenosplenic ligament which runs to the diaphragm.

2.3. Innervation

(Deng and Kaufman 2001, Felten et al 2004, Guyton and Hall 2005, Jänig 2006, Jones 2005)

The spleen is innervated by both the sympathetic and parasympathetic nervous systems.

Sympathetic innervation arises from the thoracic segment T_6 -T_9 while the parasympathetic innervation arises from the occiput-atlas-axis region (OAA).

Both systems have afferent and efferent functions.

This means that a condition of the spleen can create a somatic dysfunction at T_6 -T_9. The 7^{th} thoracic vertebra and paravertebral musculature will be painful when palpated.

The viscerosomatic reflex can be readily identified in the left transverse abdominal muscle.

The splenic veins constrict under influence of autonomic stimulation. When this constriction occurs it remains in effect during approximately 1 hour and results in an increased outflow of blood from the spleen. *(Farrell and Camougis 1964)*

There is also a demonstrated relationship between poor sympathetic function and the immune function of the spleen. A reduction of 80% of antibody production is possible, meaning that the osteopath must always make sure that the spleen segment is functioning optimally in patients with weakened immune systems.

The balance of general neurovegetative tone is essential for the immune function of the spleen. Acute stress results in an increase in immune action while chronic stress causes decreased immunity. *(Felten et al 2004)*

3. Physiology

(Cesta 2006, Steiniger and Barth 2000, Tortora 1989, Vanhoensacker and De Schepper 2000)

3.1. Reserve and Filter Function

The first of the two important functions of the spleen (red pulp) is the filtering of the circulating blood and the removal of old red blood cells and circulating particles. The spleen is also acting as a blood reservoir.

3.1.1. Red pulp

Consists of sinuses (blood cavities) and cords of parenchyma (with macrophages, red blood cells, lymphocytes). Phagocytosis of dead red blood cells occurs within this

tissue (red blood cells are active for approximately 80 to 120 days) as well as any foreign materials. The sinuses unite to form the splenic veins. These sinuses contain contractile tissue. The red pulp contributes to 75% of the total volume of the spleen.

The red pulp is important for:

1. the phagocytosis
2. the haematopoiesis (in the foetus)
3. the recycling of iron
4. the red pulp is a reservoir of thrombocytes and immature erythrocytes

3.1.2. Diver's reflex

(*Foster and Sheel 2005, Schagatay et al 2001, Schagatay 2005)*

Athletic animals such as the horse or dolphin maintain a significant reserve of red blood cells in the spleen which are released during physical stress. Due to this reserve of red blood cells the viscosity of the blood is reduced in rest and so the heart is relieved. In humans this erythrocyte reserve in the spleen is less substantial. Therefore the emphasis upon the lymphatic function when discussing the spleen. In cases of acute physiological stress the human spleen also becomes active under sympathetic nervous control (contraction of the smooth muscles and elastic fibers of the splenic capsule). The human spleen consists of fewer contractile tissues than that of the athletic animals. The introduction of red blood cells into the circulation by the spleen cannot be underestimated and the spleen can therefore be described as an oxygen reservoir. This function is comparable to the splenic function of the walrus. This mammal can remain under water for long duration thanks to the large reserve of red blood cells in the spleen. Studies demonstrate that if humans hold their breath it results in normal arterial flow to the spleen and increased venous outflow from the spleen due to an increase in the diameter of the splenic veins. The spleen reduces in volume by 14 to 18%. This effect appears to be most significant during the first apnoea and progressivley weaker each following apnoea. These studies were completed with trained divers as subjects. If one holds the breath several times consecutively the duration becomes progressively longer, showing the effect of the increase in circulating red blood cells (more oxygen transport). The spleen remains in a state of contraction for several minutes to one hour after the initial apnoea. Following splenectomy this phenomen does not occur any longer. During a contraction of the spleen the blood pressure increases and brachycardia occurs. In short, apnoea (reduced oxygen inflow) results in splenic contraction, associated increase in blood pressure and brachycardia. If the apnoea is combined with cooling of the forehead and orbital region (cold water or ice) this effect is further increased. This indicates that sensory input via the opthalmic division of the trigeminal nerve increases this phenomen. Sudden anxiety also results in contraction of the spleen and the other described reactions. The liver does not contract in the same situation, suggesting that the liver does not possess the same contractile nature as the spleen. Physical exercise and haemorrhage also cause a contraction of the spleen. *(Stewart et al 2003)* After eating, the spleen increases in size for several hours. It is not known why this occurs.

3.1.3. Baroreceptors and the splenic volume

It has been demonstrated that the spleen is under the influence of the baroreceptors of the carotid sinus. The venous circulation can be altered by reflex sympathetic influence from the carotid sinus. These baroreceptors are pressure receptors that are sensitive to sympathetic nervous stimulation and manual pressure. They, in turn, stimulate the efferent cardiopulmonary nerve activity and therefore the cardiac rhythm (this decreases by 5 to 15 beats per minute) and the blood pressure (this decreases by 5 to 10 mmHg). An osteopath must be aware of this. Compression of the spleen may be employed in certain cases but they must not be used in patients with high blood pressure. Manual pressure on the spleen will increase the venous pressure in the spleen via the baroreceptors located in the spleen. These techniques are appropriate for patients without elevated blood pressure or patients with low bloodpressure. In cases of liver congestion (as part of portal hypertension) the pressure in the splenic vessels is so elevated that this reflex is constantly active and the heart rate and blood pressure rise. In these cases the osteopath should avoid treating the spleen and instead focus on the liver. The aim of treating the liver is decongestion. Once this is achieved and the blood pressure is normalised the decision can be made to treat the spleen directly, if still needed.

It is also known that liver congestion results in splenic congestion and dysfunction (eg: liver cirrhosis).

The baroreceptors in the carotid sinus influence the volume of the spleen but not that of the liver. (*Warren 1963*) Therefore the spleen, and not the liver, plays an active role in the arterial blood pressure regulation. (*Herman et al 1982, Maass-Moreno and Rhote 1991, Moncrief and Kaufman 2005, Stewart et al 2003*) The spleen also contains a rhythmic contraction. In healthy individuals this is once per 25 to 50 seconds. In individuals with low blood pressure or poor splenic function (congestion) this rhythm is much lower - once per 60 seconds or even longer. The slower this rhythm the lower the effect upon the blood pressure. These rhythmic contractions are controlled by the autonomic nervous system and by the adrenal glands (hormonal). The hormonal system reacts slower than the sympathetic system. Both systems react to the CO2 concentration in the blood. This indi-

cates the importance of a good functioning spleen in patients with lung dysfunctions - not only in terms of the immune function of the spleen but also in terms of the oxygen concentration of the blood. Recent studies have also shown the presence of baroreceptors in the spleen itself. (*Moncrief and Kaufman 2005*)

3.2.Immune Function

The second of the two important functions of the spleen (white pulp) is as a defensive barrier against micro-organisms that have entered the blood stream. That is, the creation of a primary immune reaction.

3.2.1. White pulp

The lymphocytes, both B and T types, are found along the blood vessels where they are synthesised and stored. *(Figure 8)*

Arterial blood enters the spleen via small divisions of the splenic artery. These are surrounded by PALS (periarteriolar lymphocytic sheath). The lymph follicles are arranged around the edges of the PALS. The PALS are rich in T-lymphocytes while the follicles mostly consist of B-lymphocytes more specifically B-lymphocytes that react against capsular bacteria (marginal sinus lymphocytes). The white pulp forms the lymphoidal tissue of the spleen, consisting of the T-cell part (PALS) and the B-cell part (follicles). After this tissue the sinuses begin which then drain into the veins.

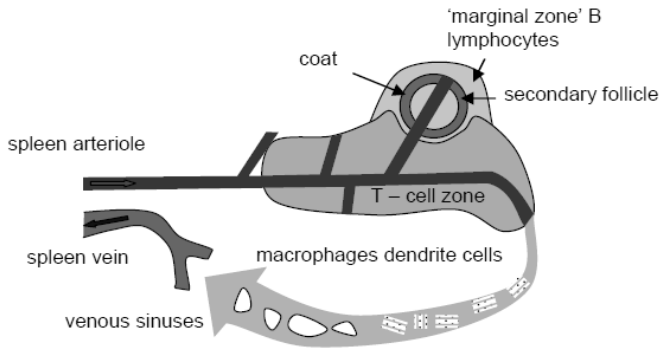

Figure 8 *– Function of the spleen*

4. Mobility

During diaphragmal inhalation the spleen displaces inferiorly (approximately 4 cm) and tilts medially and anteriorly. A simultaneous internal rotation occurs in the horizontal plane *(Figure 9)*.

The axis of motion for this mobility is through the hilus of the spleen.

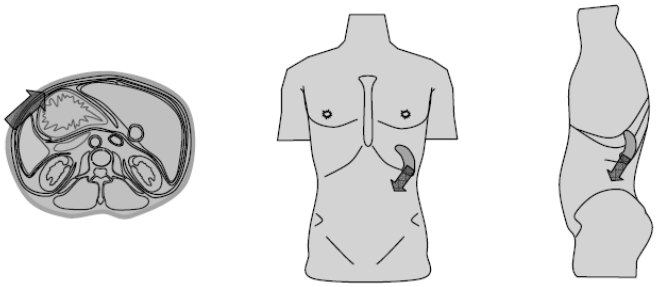

Figure 9 *– Mobility of the spleen during inhalation*

5. Working Diagnosis and Physical Diagnosis

The patient working diagnosis when combined with the clinical examination allows identification of several disorders of the spleen.

The wandering spleen (splenoptosis)

The most important fixation of the spleen is via the splenorenal ligament and the spleen is supported by the phrenocolic ligament. Birth defect or non-formation of this ligament results in a 'wandering spleen'. A splenectomy is completed due to the fact that the spleen encroaches upon other organs causing abdominal pain and due to the high risk of torsion of the splenic vessels which leads to acute abdomen.

The origin of the wandering spleen is the congenital or acquired laxity of the suspensory ligaments of the spleen. It occurs in children as a congenital anomaly but also in adults as an acquired condition: women more frequently than men (7:1) and is then associated with a ptosis of the abdonimal organs. *(Vermylen et al 1983)* The condition is rare.

Splenomegaly *(Wright and Wilkins 2000)*

A spleen that is palpable is at least double its normal size. An enlarged spleen does not result in immediate symptoms. If an enlarged spleen presses upon the stomach a full feeling will occur after very little food intake.

If the enlarged spleen removes too many red blood cells constant fatigue will result.

Frequent infections or a susceptibility to haemorrhage can also indicate a dysfunction as a result of splenomegaly.

Causes of splenomegaly:

- Viral infection such as mononucleosis (glandular fever)
- Bacterial infections such as syphilis or endocarditis
- Malaria
- Liver cirrhosis or liver congestion
- Haemolytic anemia
- Systemic conditions such as leukemia or Hodgkin's lymphoma

- Certain metabolic conditions such as Gaucher disease or Niemann-Pick disease.

In cases of liver congestion, there will always be a degree of splenic congestion. The osteopath must ensure that the venous drainage via the portal vein and the liver itself are treated before the spleen.

Splenic rupture

This is a bleeding of the spleen due to a trauma. The spleen is the most vulnerable organ in cases of trauma.

After abdominal trauma it is important that the blood pressure of the patient is measured along with other vital signs. This should occur not only immediately following the event but also repeated during the hours to follow.

It is possible that the bleeding occurs in an accessory spleen and the symptoms will then take longer to present.

20 to 30% of the population have one or more accessory spleens.

The symptoms of a splenic rupture are:

- Dizziness
- Blood pressure decrease
- Heart rate increase

These quite clear symptoms can be camouflaged by smaller bleedings or bleeding in an accessory spleen. Certain cases involve an intial presentation of musculoskeletal complaint. This will most commonly involve the left shoulder and thoracic regions along with respiratory difficulty. The classic symptoms will then occur later (even longer than 1 hour) after the trauma.

The osteopath must be aware and alert to such clinical presentations.

Note about splenectomy *(Bisharat 2005, Newland et al 2005, Wright and Wilkins 2000)*

In some situations the spleen must be removed due to life threatening damage or cancerous growth. This affects the clinical presentation of the patient. Patients after splenectomy can live a mostly normal life. However, some dysfunctions do result:

The most important complication following a splenectomy is the OPSI-syndrome "Overwhelming post-splenectomy infection." In the majority of cases "Overwhelming post-splenectomy infection" (OPSI) is the result of encapsulated infective agents such as streptococcus pneumoniae, haemophilus influenzae and neisseria meningitis. Others describe the importance of bacteria such as escherichia coli, pseudomonas, aerugnosa, capnocytophagia canimorsus (after dog bites), group-B-streptococcen, enterococcen ssp., ehrlichia spp. as well as protozoans such as the plasmodium that causes malaria. This condition, first described in 1952, begins with mild symptoms similar to flu but which then quickly evolve into a severe stadium with a high mortality. OPSI most usually occurs within 2 years of the splenectomy. The precise incidence of this infection is not known but the best assessment of risk is between 0.18-0.42% per year after the splenectomy with a life-long risk of 5%. Bisharat et al. evaluated all related studies completed between 1966 and 1996. This study showed that 3.2% of splenectomy patients developed an invasive infection with a total mortality of 1.4%. The average time interval between infection and splenectomy is 22.6 months. The incidence of OPSI is higher in patients with thalassemia major (8.2%) and sickle-cell anemia (7.3%) and children are also more often affected.

An important preventative measure is vaccination. Ideally, these vaccinations should occur before the splenectomy or if not feasible as rapidly as possible after the operation.(Newland et al. 2005) The patient must also be informed and educated about the risk of invasive infections so that they do not hesitate to consult a doctor in case of fever.

It is also proven that adults require more frequent antibiotic therapy after a splenectomy. Patients are also more frequently fatigued and their ability to adjust to changes in environment or activity is not optimal (resistance).

6. Clinical Diagnosis

6.1. Palpation of muscle tone

Palpation of hypertonic paravertebral muscles around T_7 together with increased tone of the left transverse abdominal muscle indicate a possible problem of the spleen.

6.2. Palpation of the spleen in sitting position

The patient is sitting and the osteopath stands behind the patient. Both hands are used to palpate under the left dome of the diaphragm in a cranial/left direction. If the patient is allowed to slump into kyphosis a normal spleen can sometimes be palpated but usually this is not possible. If the spleen is clearly palpable then it indicates a likely swelling.

This is usually associated with congestion of the liver and of the entire upper digestive system as it drains via the portal system into the liver.

6.3. Palpation of the spleen in supine position

The patient is supine with both legs extended on the table. The osteopath uses the fingers of both hands to palpate posteriorly just under the left 10th rib. If the spleen is felt under the 10th rib it is likely to be congested. A spleen that reaches to the edge of the 10th rib is likely to be pathological.

6.4. Test of the lower ribs in the frontal plane

The patient is sitting with the thorax upright. The osteopath contacts laterally on the lower ribs using both hands and lifts the ribs superiorly during the patient's inhalation and inferiorly during the exhalation. During inhalation the thoracic spine is extended and during exhalation it is flexed.

6.5. Test of the lower ribs in the sagittal plane

The patient is lying on the side and the osteopath places one hand posterior and the other hand anterior upon the lower ribs. The test is for the mobility of the inhalation and exhalation motions of the ribs. Care must be taken that the patient is correctly positioned in the sagittal plane with the lower thoracic region in neutral.

6.6. Test of the lower ribs in the horizontal plane

The patient is lying on the side with the lower leg extended on the table and the upper leg bent so that they are stable. The osteopath tests the ribs in anterior and posterior rotation.

7. Osteopathic Techniques

7.1. Apnoea

(Bakovic et al 2003, Radermacher and Muth 2002, Schagatay et al 2005)

The patient inhales deeply and holds his breath as long as possible. A rest phase of 2 minutes is given.

The apnoea is repeated 3 times. This technique creates a contraction of the spleen which decreases the volume of the organ by 14-18%; an effect which remains for several minutes to a few hours. The patient is advised to repeat this several times per day.

This technique provides a training effect upon the contractility of the spleen and increases the oxygen saturation of the blood.

This technique should be avoided for patients with structural heart conditions and high blood pressure (because of risk of ventricular arrhythmia).

The technique is therefore suitable for patients with fatigue syndromes and with low blood pressure. Compressions of the spleen should be considered in the same context.

7.2. Mobilisation of the lower ribs in the frontal plane

The patient is sitting with the thorax upright. The osteopath contacts laterally on the lower ribs using both hands and lifts the ribs superiorly during the patient's inhalation and inferiorly during exhalation. During inhalation the thoracic spine is extended and during exhalation it is flexed. Mobilisation is applied in the direction of mobility loss. Superior mobilisation is most effective during inhalation and inferior mobilisation during exhalation.

7.3. Mobilisation of the lower ribs in the sagittal plane

The patient is lying on the side and the osteopath places one hand posterior and the other hand anterior upon the lower ribs. The ribs are mobilised into inhalation and exhalation. Care must be taken that the patient is correctly positioned in the sagittal plane with the lower thoracic region in neutral. Superior mobilisation is most effective during inhalation and inferior mobilisation during exhalation.

7.4. Mobilisation of the lower ribs in the horizontal plane

The patient is lying on the side with the lower leg extended on the table and the upper leg bent so that they are stable. The osteopath mobilises the ribs into anterior and posterior rotation. Superior mobilisation is most effective during inhalation and inferior mobilisation during exhalation.

7.5. Drainage of the spleen in sitting position

The patient is sitting and the osteopath stands behind the patient. The osteopath palpates the spleen with both hands and lifts it superiorly during the patient's exhalation. The pressure is lightly maintained during the following inhalation. This technique is repeated several times.

7.6. Drainage of the spleen in supine position

The patient is supine with both legs flexed on the table. The osteopath palpates the spleen with both hands and lifts it superiorly during the patient's exhalation. The pressure is lightly maintained during the following inhalation. This technique is repeated several times.

7.7. Drainage of the spleen lying on the side

The patient is lying on the left side. The osteopath places both hands under the patient's spleen and lifts it superiorly during the patient's exhalation. The pressure is lightly maintained during the following inhalation. This technique is repeated several times.

7.8. Induction of the spleen

The patient is supine with both legs extended on the table. The osteopath places one hand posterior to the spleen between ribs 9 and 11 and the other hand anterior. A gentle compression is given, following the respiration of the patient. This technique is successful when the region becomes more elastic.

7.9. Neurolymphatic reflexes (*Owens 1937*)

These reflexes were discovered by Frank Chapman, an American osteopath, and are important:

1. as a diagnostic tool
2. to stimulate the blood flow, with special accent on the lymphatics
3. to improve the visceral function

In cases of visceral pathology these reflexes present as local swellings ('ganglioform contractions') with a predictable topography. These swellings, of approximately 1 cm diameter, are specific to each organ and are found on both ventral and dorsal sides of the body.

The treatment of the reflex points consists of a soft, circular massage. The massage is done until the reflex points have disappeared. If the points are still present after a few minutes of this massage this indicates that the pathology behind the point is of structural nature and/or local musculoskeletal lesions are limiting the effect.

Chapman described one indication for treatment of the spleen which he called 'splenitis'. The reflex points are found:

On the ventral side: in the left intercostal space between ribs 7 and 8, close to the costal cartilage.

On the dorsal side: in the zone between the left transverse processes of T_7 and T_8.

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Note:

All the described tests and techniques can be seen on streaming video: www.osteopathy.eu (part e-books).

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OMT as an adjunct therapy for post-traumatic headache in U.S. soldiers: A case series

Matthew Kozminski and Tonya Kozminski

Introduction:

More than half of all combat related injuries sustained by U.S. troops are a result of explosive munitions and blast injuries occuring almost daily in the ongoing conflicts in Iraq and Afghanistan as a result of rocket-propelled grenades, improvised explosive devices, and land mines.[1] In addition, military personnel may also sustain blast injuries caused by artillery, rocket and mortar shells, and aerial bombs.[2] A list based on consecutive sample of blast injured patients (N=50) seen at the Polytrauma Rehabilitation Center at Veterans Affairs Medical Center in Tampa from August 2004 until August 2005 shows that concussion is one of the most commonly overlooked blast related condition in patients with polytrauma.[2]

In general, the number of individuals who develop post-traumatic headache as a result of mild or minor head injury are variable, ranging from 30-80% and paradoxically have more frequent severe post-traumatic headache as a noted symptom.[3] Tension-type, migraine-like, cluster-like, and mixed post-traumatic headaches are similar to the non-traumatic counterparts.[4] Post-traumatic migraine headaches are not unusual.[5] It has been suggested that trauma to the head or neck triggers the migraine process in a susceptible individual who previously did not have migraine headaches.[6]

The trigeminal nerve is a complex nerve that carries sensation from the anterior two-thirds of the head and supplies blood vessels that make up the trigeminovascular system, probably involved in migraine.[7] Once the fibers enter the brainstem, some descend to the upper cervical spinal cord in the neck and make connection with the occipital nerve, primarily C2, which supplies sensation to the back of the head.[8] The C2 spinal nerve and its dorsal root ganglion have a close proximity to the lateral capsule of the atlantoaxial (C1-2) zygapophyseal joint and innervate the atlantoaxial and C2-3 zygapophyseal joints; therefore, trauma to these joints can be a source of referred head pain.[9] The third occipital nerve (dorsal ramus C3) has a close anatomic proximity to and innervates the C2-3 zygapophyseal joint. This joint and the third occipital nerve appear most vulnerable to trauma from acceleration-deceleration injuries to the neck.[9] Pain is referred from the C2-3 zygapophyseal joint to the occipital region but is also referred to the frontotemporal and periorbital regions.[9]

Case History:

Three active duty U.S. Army soldiers ranging 22 to 26 years of age were evaluated by a neurologist post-deployment from Iraq for complaints of chronic headache. All reported indirect head trauma secondary to forces of explosions in close proximity leading to concussive symptoms: transient confusion, seeing "stars", feeling dazed, and headache. None reported a history of a primary headache disorder or chronic headaches prior to exposure to explosions. All three met the ICHD-II criteria for chronic post-traumatic headache attributed to mild head injury.[10]

All were offered topiramate for migraine prophylaxis as well as a triptan medication for abortive therapy (two were offered eletriptan, one offered zolmitriptan) and were counseled toward the risk of transformed migraine with triptan overuse. Two soldiers attended a headache education seminar where non-pharmacological approaches to treating headaches are discussed: proper diet and elimination of caffeine, common headache triggers, stress reduction, etc.

Review of Literature:

Osteopathic manipulative medicine provides a patient centered approach that integrates recognized and rational healing methods, including OMT, to improve the health and physiologic function of patients.[11] There is some basis for the belief that physical manipulations, many of which focus on the cervical spine, can be beneficial in treating certain headache disorders since pain that occurs in the head may frequently arise from or be influenced by the various soft tissues, neurogenic, or osseous structures of the head, neck, and upper body.[12] Pain elicits a heightened response of the sympathetic nervous system that can cause vasoconstriction, ischemia, chemical changes, more muscle contraction, and pain, creating a vicious cycle.[13] Osteopathic manual treatments are believed to improve circulation, release restrictions in the joints, reduce tension in the muscles, fascia and the dura mater, decrease nociceptive input and promote a normalization or calming effect of the CNS.[13] The importance of focus on occipito-atlantal joint, occipital condyles, and occipito-mastoid joint, and sphenobasilar syncondrosis in migraine and usage of craniosacral techniques for cervicogenic headache has been emphasized in prior literature. [9,14,15] Literature search did not yield any discussion of the usage of OMT for any patients with post-traumatic headaches.

Treatment and Discussion:

All soldiers opted to attend an OMT clinic for non-pharmacological adjunct therapy which entailed three once weekly serial evaluations by an osteopathic provider that would examine for somatic dysfunction and treat as

felt appropriate. It should be noted that all individuals noted posterior occipital, cervical, or upper back tenderness as an associated symptom to the headaches or as a trigger to the headaches. None of the soldiers had any potential contraindications to OMT such as penetrating/ schrapnel injury to the head, prior neck surgery/hardware, history of malignancy, history of major blood vessel dissection, significant degenerative spine disease or radiculopathy, or a prior poor outcome from a manual therapy. A combination of HVLA, muscle energy, counterstain, myofascial release, and soft tissue techniques to somatic dysfunction detected in the occipito-atlantial, atlanto-axial, ribs, cervical, thoracic, lumbar, sacral, innominate regions were utilized.

At the termination of the three week trial of OMT, soldiers were asked the following questions: Did you find the usage of OMT in addition to traditional medications, educational, and behavioral therapies helpful? Options for answering this question were: yes, clearly helpful, somewhat helpful, or not helpful at all? If one did not find the usage of OMT helpful the following options were given: It had no effect on headache symptoms, helped some symptoms associated with the headaches but not all symptoms, or made the headaches worse. Two of the soldiers stated that the usage of OMT was clearly helpful. One individual had stated that OMT was somewhat helpful but yet reported it had no effect on headache symptoms. For this particular individual, eventual moderate relief of headaches was obtained with adjunct usage of injection of trigger points and areas of tenderness with
local anesthetics.

Conclusion:

It would appear as if the usage of OMT as an adjunct therapy in addition to traditional pharmacological therapies for soldiers suffering from post-traumatic headache attributed to mild head injury with cervicogenic triggers was helpful. No individual reported worsening of symptoms or a poor outcome from OMT suggesting its safety in those without a history of penetrating head trauma, cervical spine disease, disc pathology, or radiculopathy, or history of prior neck surgery/hardware. Future research should be performed in order to examine this particular patient population as well as investigate similar outcomes for those with moderate or severe head injury. Ultimately, osteopathic providers treating patients who are soldiers with chronic post-traumatic headaches ought to consider OMT as a useful adjunct therapy.

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Osteopathic manual medicine for vertigo: review of literature, case report, and future research

Marcel Fraix

Vertigo is the sensation of spinning or swaying while the body is stationary with respect to the earth or surroundings. It is oftentimes associated with autonomic symptoms, including diaphoresis, nausea, and vomiting. In general, vertigo is associated with dysfunction of the vestibular system and Cranial Nerve VIII (i.e. peripheral vertigo) or central nervous system (i.e. central vertigo). There are a number of causes of vertigo, with the most common peripheral causes being Benign Paroxysmal Positional Vertigo, Meniere's disease, Labyrinthitis, and Vestibular Neuritis and the most common central causes being an ischemic or hemorrhagic insult to the cerebellum or brainstem.[1]

The overall incidence of dizziness, vertigo, and imbalance is 5-10%, and it reaches 40% in patients older than 40 years.[2,3] It is the third most common complaint among all outpatient visits and the single most common complaint among patients older than 75 years of age.[4] Additionally, vertigo can be considerably incapacitating for patients, both in terms of productivity and quality of life, and challenging for physicians, both with respect to diagnosis and treatment.

Anatomy

The vestibular system is the primary sensory system responsible for detecting movement and maintaining equilibrium. Along with the cochlea, it is situated in the vestibulum of the inner ear. (Figure 1) It is comprised of the semicircular canals, which detect change in rotational movements, and the otolithic organs, which detect linear accelerations.[5]

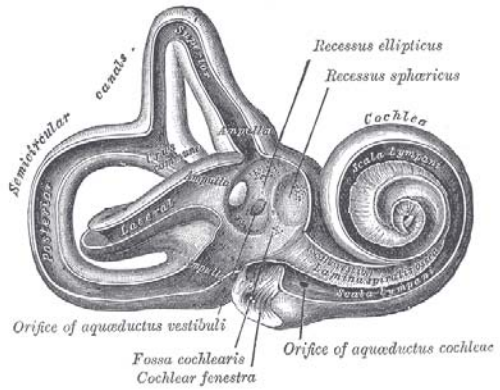


Figure 1

There are three semicircular canals, lateral, superior and inferior. When the head rotates, there is movement of the fluid (endolymph) within the semicircular canals. The movement of this fluid in turn presses on the cupula and allows its hair cells to detect changes in rotational acceleration. The hair cells convert this information into an electrical impulse, which is transmitted via the vestibulocochlear nerve (CN VIII) to the brainstem.[5]

The otolithic organs are composed of the utricle and saccule. Like the semicircular canals, the utricle and saccule contain hair cells. (Figure 2) These hair cells have apical cilia with otoliths which convert information regarding horizontal and vertical acceleration of the head into electrical signals, which can be transmitted to the brainstem via CN VIII.[5]

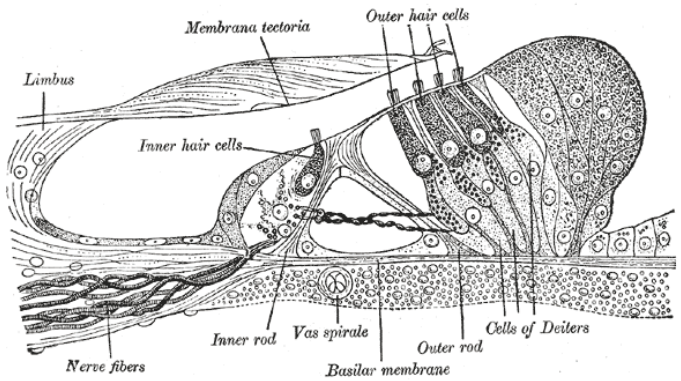


Figure 2

Along with input from the ocular and peripheral nervous systems, the vestibular information from CN VIII is received and integrated within the brainstem, cerebellum, and cortex in order to maintain balance. Disruption of the vestibular system can compromise this ability to maintain balance and be secondary to a variety of disease processes.

Pathology

There are a number of causes of vertigo, with the most common peripheral causes being Benign Paroxysmal Positional Vertigo, Meniere's disease, Labyrinthitis, and Vestibular Neuritis.

Benign Paroxysmal Positional Vertigo

Benign Paroxysmal Positional Vertigo (BPPV) is a common vestibular disorder that is thought to be due to otoconia which become dislodged from the utricle and migrate into the semicircular canals. When the head is turned, the debris of the otoconia interferes with the normal movement of the endolymph within the semicircular canals and creates the sensation of vertigo. Although the etiology of BPPV is thought to be idiopathic, there are certain conditions which may be associated with it, including head and neck trauma, vestibular degeneration, and prolonged bed rest.[6]

Patients suffering from BPPV complain of intermittent vertigo that is typically provoked by abrupt movements of the head, especially looking upward, lying down, turning over in bed, and bending over. Nausea may be associated with the vertigo, but patients should not have neurological symptoms such as motor weakness, diminished sensation or tinnitus.

On physical examination, nystagmus is typically present and is usually of the mixed type. The Dix-Hallpike maneuver is helpful in confirming the diagnosis. The test is performed by moving the patient quickly from a sitting position to a supine position with the head hanging 45º below the horizontal. (Figure 3) Patients experience vertigo with accompanied nystagmus, which is typically toward the affected side.[6]

Figure 3

Meniere's disease

Meniere's disease is a disorder of the inner ear that affects both balance and hearing. The etiology of Meniere's disease is not clearly understood, but it is thought that it may be related to excess fluid in the inner ear (endolymphatic hydrops). This excess fluid in turn interferes with the normal functioning of the structures within the inner ear.[7]

Patients with Meniere's disease can experience a variety of symptoms. These can include periodic bouts of vertigo, unilateral or bilateral hearing loss or tinnitus, and a sensation of fullness or pressure in one or both ears. Hearing loss is typically progressive and initially found in the lower frequency range. Additionally, patients may experience one symptom initially and then more as the disease progresses.[8]

Like Benign Paroxysmal Positional Vertigo, the work up for Meniere's disease requires a detailed otolaryngological examination. During an episode of vertigo, nystagmus should be present. Audiometry is also important to assess for sensorineural hearing loss. Because there is no definitive test for Meniere's disease, it is a diagnosis of exclusion.[7]

Vestibular Neuritis and Labyrinthitis

Vestibular Neuritis and Labyrinthitis are thought to be caused by an inflammatory process affecting either CN VIII or the inner ear respectively. This inflammatory process likely has an infectious etiology, typically viral in origin.

The prominent symptom of Vestibular Neuritis and Labyrinthitis is vertigo without associated hearing loss. Patients may report experiencing an upper respiratory infection prior to the onset of vertigo. Symptoms typically have an acute onset and resolve over the following one to two weeks.[9]

Patients with Vestibular Neuritis or Labyrinthitis usually exhibit nystagmus on physical examination. Electronystagmography (ENG) testing is also helpful in identifying the reduced responses to motion of the involved side.

Treatment

Treatment options for BPPV, Meniere's disease, Vestibular Neuritis, and Labyrinthitis are based upon the proposed mechanism of disease for each respective disorder. In addition to disease specific interventions, medications and vestibular rehabilitation are used to help alleviate the vertigo associated with each disorder.

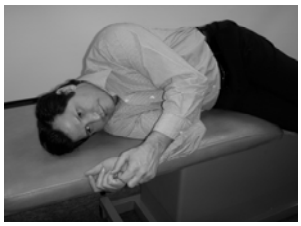
The treatment of choice for BBPV is the Epley's maneuver. By moving the patient's head through a sequence of positions (A – D in Figure 4), it is thought that the displaced otoconia are repositioned within the semicircular canals so as to reduce the patient's vertigo. Studies examining the effectiveness of the Epley's maneuver have shown fairly high rates of success in alleviating the vertigo associated with BPPV. Korres demonstrated that 92.1% of patients experienced relief of their vertigo after undergoing the repositioning maneuver.[6]

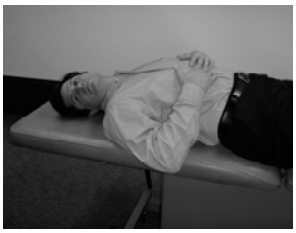
Treatment for Meniere's disease is less defined and is also aimed at directly managing the symptoms associated with the disorder. Diuretics (hydrochlorothiazide) and a low salt diet may be used to theoretically reduce excess fluid in the inner ear.[10] Corticosteroids (prednisone) may also be used in an attempt to reduce endolymphatic pressure. More aggressive management may include intratympanic injection of gentamicin, endolymphatic sac decompression, and labrynthectomy.[11]

The treatment for Vestibular Neuritis and Labyrinthitis is typically conservative and aimed at controlling symptoms until the viral sequelae resolve. There has also been some evidence suggesting the effectiveness of corticosteroids (methylprednisolone) and anti-viral medication (valacyclovir) in the treatment of these disorders.[12]

In general, symptomatic management of vertigo associated with BPPV, Meniere's disease, Vestibular Neuritis, and Labyrinthitis entails medication and vestibular rehabilitation. The two primary classes of medications used are antihistamines (i.e. meclizine), which depress labyrinthine

A





D B

C

Figure 4

function, and anticholinergics (i.e. scopolamine), which are thought to suppress conduction in the vestibular cerebellar pathways. In addition to using medication, vertigo may be addressed with vestibular rehabilitation therapy, which is a specific form of physical therapy that facilitates habituation and compensation for deficits resulting from the above disorders. It entails a variety of different exercises that are usually directed by a physical therapist, including ocular motor exercises and balance, and gait exercises.[13,14,15,16] The ultimate aim of vestibular rehabilitation therapy is to improve balance and stability and decrease handicap secondary to vertigo.

Another manner in which vertigo associated with BPPV, Meniere's disease, Vestibular Neuritis, and Labyrinthitis may be treated is the use of manual medicine, specifically Osteopathic Manual Medicine (OMM). To date, there have been no studies examining the efficacy of Osteopathic Manual Medicine in the treatment of vertigo. Despite this, Osteopathic literature and the clinical experience of Osteopathic physicians suggest that OMM is beneficial in alleviating vertigo, particularly when it is peripheral in nature.[17,18,19,20] There have been two studies performed by manual medicine practitioners that have investigated the potential effects of cervical manipulation on dizziness. These studies appeared to suggest that spinal manipulation may potentially alleviate symptoms of cervicogenic dizziness.[21,22]

Case Report

A 52 year-old right hand dominant Caucasian female presented to the Osteopathic Manual Medicine clinic with complaints of intermittent dizziness for the past 5 months. She stated that the spinning sensation primarily occurred when she turned her head quickly, bent over or changed positions (i.e. lying to sitting or sitting to standing). It was interfering with her job and personal activities, including her physical duties as a nurse and driving an automobile. There was no associated hearing loss or tinnitus and her past medical history was essentially unremarkable except for occasional mechanical lumbar dysfunction. She had been evaluated by an otolaryngologist and found to have Benign Paroxysmal Positional Vertigo. Both the Epley's maneuver and anticholinergic medication had proven to be minimally effective in alleviating or reducing her vertigo.

On physical examination, her blood pressure was 115/70 mm Hg, heart rate 76 beats per minute, respirations 14 breaths per minute, and body temperature 98.4 ºF. Examination of ears, eyes, nose, and throat were unremarkable and no significant nystagmus was noted with the Dix-Hallpike maneuver. Additionally, there was no indication of conductive hearing loss with normal bilateral Rinne and Weber tests. Neurological examination demonstrated normal motor strength and sensation. Osteopathic structural examination revealed internal rotation of the right temporal bone; compression of the atlanto-occipital joint with extension, left sidebending, and right rotation; extension, left sidebending, and left rotation of the second cervical vertebrae; right sidebending and left rotation of cervical vertebrae three through five; inhalation somatic dysfunction of the left 1st rib with associated hypertonicity of the scalene musculature and flexion, right sidebending and right rotation of the 1st thoracic vertebrae. Examination of the sacrum also revealed a left on left sacral torsion.

The patient's cranial, cervical, thoracic, costal, and sacral somatic dysfunctions were treated with muscle energy, high-velocity, low amplitude, strain counter-strain, and cranial osteopathy. The patient tolerated treatment with OMM well and underwent a total of five treatment sessions. After the first two sessions, she reported a significant reduction in her vertigo. By the fifth session, her symptoms had essentially resolved and she was no longer modifying her work or daily activities. At the conclusion of treatment, the patient repeated the Dizziness Handicap Inventory (DHI), which was administered prior to starting treatment with OMM. Initially, she had scored 19 (maximum score: 50) on the DHI and at the conclusion of treatment, her score had decreased to 4, suggesting an overall improvement in her symptoms. (Figure 5)

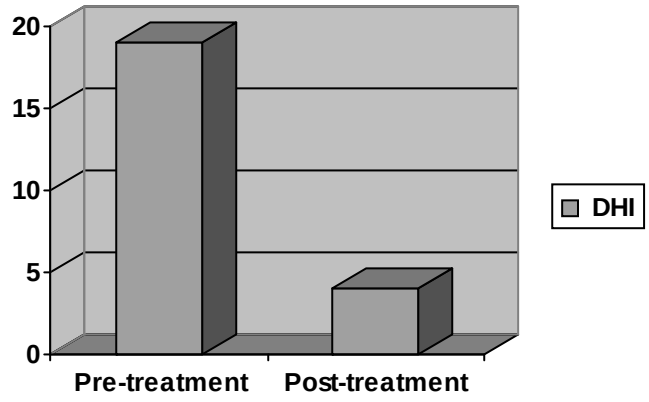


Figure 5

Discussion

Vertigo is a common disorder that is typically associated with dysfunction of the vestibular system and Cranial Nerve VIII. Its etiology is dependent upon what anatomical structures of the vestibular system are affected and can include Benign Paroxysmal Positional Vertigo, Meniere's disease, Labyrinthitis, and Vestibular Neuritis. Successful treatment is dependent upon proper diagnosis, implementation of etiology specific therapy, and management of symptoms.

Although there have been limited studies examining the effectiveness of manual manipulation on dizziness, Osteopathic literature and the clinical experience of Osteopathic physicians suggest that Osteopathic Manual Medicine (OMM) is beneficial in alleviating vertigo, particularly when it is peripheral in nature.[17,18,19,20,21,22] In the case presented, OMM appeared to be fairly effective in alleviating the patient's vertigo and improving her function, as evidenced by an improvement in her pre and post -treatment Dizziness Handicap Inventory (DHI) scores. Additionally, because conventional treatment was unsuccessful in resolving the dizziness associated with her Benign Paroxysmal Positional Vertigo, OMM may not only be helpful as an adjunct therapy, but as the primary one for managing vertigo. Further research is warranted in examining the safety and feasibility and potential efficacy of OMM for the treatment of vertigo.

Currently, a pilot study examining OMM for the treatment of vertigo is being conducted at the OMM clinic affiliated with Western University of Health Sciences / College of Osteopathic Medicine of the Pacific and Downey Regional Medical Center in Downey, CA. The non-randomized pre- and post-OMM treatment trial is recruiting patients with a diagnosis of peripheral vertigo (i.e. Benign Paroxysmal Positional Vertigo, Meniere's disease, Labyrinthitis, and Vestibular Neuritis). The DHI is being utilized to assess for changes in the severity of symptoms associated with a patient's vertigo pre- and post-OMM treatment. Additionally, Computerized Dynamic Posturography (CDP) is being used to detect changes in a patient's balance performance and balance control pre- and post-OMM treatment. The purpose of the study is to examine the safety and feasibility of Osteopathic Manual Medicine (OMM) in the treatment of vertigo

If the design of this pilot study proves to be amenable to studying Osteopathic Manual Medicine (OMM) for the treatment of vertigo, our next study will be a larger randomized clinical trial. It would include both treatment and control groups and examine the efficacy of OMM in the treatment of vertigo. Additionally, if the results of the pilot study indicate that a subset of patients with peripheral vertigo is potentially more responsive to OMM, the clinical trial may focus on studying this patient population.

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CME QUIZ

The purpose of the quiz found on page 30 is to provide a convenient means of self-assessment for your reading of the scientific content in the "Osteopathic manual medicine for vertigo: review of literature, case report, and future research" by Marcel Fraix, DO, FABPMR Answer each of the questions listed. The correct answers will be published in the September 2009 issue of *The AAO Journal*.

To apply for Category 2-B CME credit, transfer your answers to the AAOJ CME Quiz Application Form answer sheet on page 32 The AAO will record the fact that you submitted the form for Category 2-B CME credit and will forward your test results to the AOA Division of CME for documentation. You must have a 70% accuracy in order to receive CME credits.

Scapular Glide Continued from page 11

Glenohumeral dysfunction

A discussion of glenohumeral dysfunction is not included in this article. Antalgic fixation and guarding of the upper extremity may lead to glenohumeral dysfunction, which may progress to ankylosis. Glenohumeral dysfunction may be a secondary response to pain or dysfunction of: scapula, C-spine, or ribs. It may also be primary, and secondarily cause scapulohumeral dysfunction. In all cases of glenohumeral dysfunction, evaluation and treatment should include the muscles of scapular glide, the rotator cuff muscles: supraspinatus, infraspinatus, teres minor and subscapularis, and other muscles, and ligaments which affect humerus or shoulder movement. Those muscles include: teres major, subclavius, sternocleidomastoid, omohyoid, latissimus dorsi, pectoralis major, pectoralis minor, anterior, middle and posterior deltoid, coracobrachialis, long and short heads of biceps and the long head of triceps. The principles described are also applicable to the treatment of muscles listed above.

Conclusion:

Effective scapular treatment improves treatment outcomes, including related dysfunction of head, neck, and thorax. Significant improvement may occur after a single treatment. Tenderness at muscle attachments helps confirm impressions formed by objective findings. Appropriate evaluation and management decisions which direct treatment are based on the history and examination. Related somatic dysfunction and other conditions should also be treated.

Though this paper describes a treatment approach to the scapula and clavicle, a greater understanding of anatomy, physiology and functional interrelationships may serve to improve diagnostic accuracy, precision and effectiveness of treatment of any somatic dysfunction. In 1929, Dr. Sutherland wrote: "rendering service through the intelligent application of the cultivated anatomical-physiological touch rather than mere 'blind' treatment is the trend of the hour." This remains apropos today. Intelligent application of feeling, thinking and knowing touch results in more effective and predictable treatment outcomes, and reduced morbidity, need for diagnostic studies, and length of treatment. Dig on!

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Name of Article: *A retrospective study of decreased workers' compensation claims and cost at Downey Regional Medical Center secondary to the free Osteopathic Manipulative Medicine Resident Clinic for employees*
Author(s): *Rebecca Giusti, DO*
Publication: *Journal of the American Academy of Osteopathy, Volume 19, No.2, June 2009, pp. 35-41*

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2. D
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6. D

Complete the quiz to the right by circling the correct answer and mail to the AAO. The AAO will forward your completed test results to the AOA. You must have a 70% accuracy in order to receive CME credits.

Answer sheet to June 2009 AAOJ CME quiz will appear in the September 2009 issue.

Name of Article: *Osteopathic manual medicine for vertigo: review of literature, case report, and future research*

1. Benign Paroxysmal Positional Vertigo (BPPV) is thought to be due to which of the following?
   a. Excess fluid in the inner ear (endolymphatic hydrops)
   b. Otoconia which become dislodged from the utricle and migrate into the semicircular canals
   c. An inflammatory process affecting CN VIII
   d. An inflammatory process affecting the inner ear
   e. A tumor of CN VIII

2. Vertigo accompanied by unilateral or bilateral hearing loss or tinnitus and a sensation of fullness or pressure in one or both ears is typically characteristic of which of the following?
   a. Vestibular neuritis
   b. Vestibular labyrinthitis
   c. Meniere's disease
   d. Benign Paroxysmal Positional Vertigo (BPPV)
   e. Acoustic neuroma

3. What is the currently accepted treatment of choice for Benign Paroxysmal Positional Vertigo (BPPV)?
   a. Epley's maneuver
   b. Diuretics
   c. Dix-Hallpike maneuver
   d. Insertion of tympanostomy tubes
   e. Methylprednisolone

Name of Article: *A retrospective study of decreased workers' compensation claims and cost at Downey Regional Medical Center secondary to the free Osteopathic Manipulative Medicine Resident Clinic for employees*

1. The most common form of back pain reported by workers is:
   a. Cervicalgia
   b. Non-specific back pain
   c. Mid-back pain
   d. Low back pain
   e. Upper back pain

2. The cost-effectiveness of interventions to prevent chronicity depends on:
   a. Type of insurance the patient has
   b. Employer co-operation
   c. Early identification of the problem
   d. Avoidance of imaging studies
   e. Avoidance of pharmaceutical use

Case Study: An Osteopathic Approach to Management of a Patient with Charcot-Marie Tooth Syndrome Type II

Melissa Thoreson

Introduction

Charcot-Marie-Tooth (CMT) syndrome is the most common disorder falling under the category of inherited peripheral neuropathies called hereditary motor and sensory neuropathy (HMSN). The estimated occurrence of CMT is 17-40 cases per 100,000, more common in males than females 3:1, and is usually autosomal dominant inheritance.[1] The disorder most often affects the feet, legs and hands causing chronic weakness of muscles, atrophy and decreased sensation. The patient's history may include clumsiness, frequent ankle injuries, or being "unathletic." The neuropathy leads to a variety of dysfunctions of the extremities such as weakness of the distal leg muscles (inverted champagne bottle appearance), hammer toes, high arched feet (pes cavus), steppage gait, distal sensory loss, and loss of distal reflexes.

Multiple classifications of CMT exist, with types 1 and 2 most common. Type one is associated with segmental demyelination of the peripheral nerves and remyelination by Schwann cells. These changes may show a characteristic "onion bulb" appearance on biopsy.[1] Electrodiagnostic studies for CMT1 usually show a marked reduction in motor and sensory conduction velocity.

Type two is responsible for one third of CMT disease, is usually a diagnosis of exclusion and has a later age of onset than CMT1. CMT2 patients usually do not develop the intrinsic hand weakness associated with CMT1. CMT2 neuropathy is from a pathologic change in the axon and motor conduction velocity may be normal or slightly reduced, sensory nerve action potentials may be absent, and electromyography may reveal partial denervation.[2]

There is no cure for CMT, but continuous management may help patients cope with the symptoms of CMT. Treatment is supportive, and patients often need foot braces, but rarely so patients become wheelchair dependent.[1] Physical therapy, occupational therapy, orthopedic devices and surgery for extreme cases may be beneficial. Osteopathic examination and treatment of the patient's compensatory mechanisms secondary to the distal nerve dysfunction may improve their quality of life and aid in pain management.

Case Report

Patient K., a 45 year old Caucasian female with CMT, presented to the clinic with a chief complaint of sacroiliac pain. She was diagnosed with Charcot-Marie-Tooth syndrome type 2 in 1997 with positive peripheral muscle weakness, deceased nerve conductance in her upper and lower extremities and mild sensory loss in her upper extremities. She described occasional neuropathic pain in her sacroiliac region. She also had mild foot drop and has developed plantar fasciitis. She is seeing a specialist in peripheral neuropathy. Another physician had prescribed ankle-foot orthotics to help with the foot drop.

This patient, very proactive with her disease, was seeking care for her sacroiliac dysfunction. She had seen several specialists before coming for osteopathic manipulative medicine. Other modalities of treatment have included prolotherapy, neuromuscular massage, and physical therapy. She stated that the physical therapist trained with osteopathic modalities was more effective in treating her pain than other therapists.

Past medical history: CMT diagnosed in 1997 with positive nerve conduction studies in the distal upper and lower extremities. She currently uses ankle-foot orthotics. She does not take any medications and has no known drug allergies.

Personal history: the patient is a financial advisor, currently unmarried, denied tobacco with rare consumption of wine. She is G3P2A1. She denied any complications with any pregnancies and delivered term, healthy infants.

Past surgical history: right hand ganglion cyst removal in 1985, total vaginal hysterectomy in 1998.

Family history: her mother age 65 has osteoporosis, and father age 70 has probable CMT (history of foot drop and difficult with gait).

Review of systems: patient complained of various musculoskeletal problems, primarily foot weakness and sacroiliac pain, with mild decrease of sensation in her hands and feet. She denied history of osteoarthritis, osteoporosis or rheumatic diseases.

Physical exam: Normal healthy alert female with pertinent findings in neurological and osteopathic musculoskeletal exam. Gait analysis without orthotics noted decrease in dorsiflexion bilaterally, decreased natural angle of feet during stance phase and uneven gait with restriction at the sacroiliac joint greater on left than right. Heel walk, toe walk and heel-toe walk normal. Postural exam showed elevations of these areas compared to the other side: left mastoid, left acromioclavicular joint, right inferior border of the scapula, right iliac crest, left greater trochanter, and left PSIS.

Neurologic exam: the patient's deep tendon reflexes were absent at the knees and ankles. A slight decrease in sensation was noted below the ankle and most prominent along the lateral aspect of the foot bilaterally. Lower extremity muscle strength was 5+/5 with plantar flexion, dorsiflexion, extensor hallucis longus, quadriceps, and iliopsoas. The hamstrings were slightly weakened at 4+/5 bilaterally.

Musculoskeletal/ Osteopathic exam: Moderate increase of sympathetic tone was found in the thoracic spine. The 1st rib was elevated on the left with associated muscle spasm. Chronic ropy tissue texture changes were found in the thoracic and lumbar spine with paravertebral muscle spasm. T1-T4 NSlRr, T8-T12 NSlRr, L1-4 NSrRl with ropy tissue texture changes. L5 was found to be flexed RrSr. Lower extremities: interosseous membranes, plantar fascia and popliteal fascia restricted bilaterally. The lumbar spine, sacrum, pelvis and iliolumbar ligaments were restricted. Gluteus medius, gluteus minimus and pyriformis muscles were restricted. Sacroiliac joints restricted bilaterally. Pelvis had a right innominate anterior rotation and compression of the pubic symphysis. Sacrum revealed left on left oblique axis.

Treatment plan: Although the extent of the patients CMT2 was mild, Patient K. still suffered from foot weakness, mildly clumsy gait and sacroiliac pain from compensation to the lower extremity weakness. K.'s treatment included osteopathic manipulative treatment (OMT) to all areas of somatic dysfunction to correct for poor alignment of bony structures and ligaments and to relax muscles, and fascia under inappropriate tension. Techniques included: ligamentous articular strain, pubic decompression, muscle energy, balanced ligamentous tension, physiologic response, and HVLA to the thoracic spine. K. reported improvement immediately after the treatment. She was encouraged to continue stretching and strengthening exercises given to her by a previous physician, and continue follow up appointments with her neurologist for CMT2. K. was scheduled for follow up visits for OMT in 2 weeks.

Review of Literature

Current literature regarding management of CMT demonstrates that treatment should include supportive care for the peripheral weakness of the lower extremity. Newman et al. has determined characteristic gait changes for CMT patients. Gait changes include foot-drop, and foot supination secondary to the neuropathy causing weak ankle dorsiflexors and everters.[3] Patients in this study by Newman et al. showed tight Achilles tendons, foot-drop, and compensatory changes typical of a broad based gait (hyperextension in stance, increased foot supination, excessive internal rotation of the knees, excessive external rotation at the hips, and decreased hip adduction). These features may be a combination of adaptation to disruption of foot and ankle biomechanics as well as directly from the neuropathy. Application of these findings may be useful in order to develop more appropriate orthotic devices for CMT patients as well as incorporating osteopathic treatment.

Discussion

Although literature for specific use of OMT with Charcot-Marie-Tooth disease is lacking, basic principles of osteopathy may be applied to the treatment of patients with CMT. An important component of osteopathic manipulative treatment is returning the body to a state of postural alignment and normal gait to achieve health. In Foundations for Osteopathic Medicine it is stated that compensatory gait patterns may vary widely depending on the underlying biomechanical rationale, even though these adaptations lead to problems.[4] Thus, it is important to consider the biomechanical relationships of the entire body when trying to define the effects of an injury or altered function of the body.[4]

These general concepts may be used to help treat patients with musculoskeletal problems and pain associated with somatic dysfunction. The foot-drop and lower extremity dysfunctions associated with CMT may lead to a variety of compensatory changes. Dysfunctions of the person's gait may lead to difficulty walking, pain in the legs, as well as problems in areas not directly affected by the neuropathy such as the sacroiliac joint in this patient.

The chronic nature of the patient's postural malalignment with CMT raises concern for joint hypermobility and ligamentous laxity. Kuchera et al. states that when postural strain biomechanically overwhelms structural integrity, ligamentous laxity may result.[5] When treating patients with chronic or recurrent somatic dysfunction, as in CMT, it is important to treat the ligaments in attempt to control development of ligamentous laxity and predisposition to somatic dysfunction.

Different modalities can be used to improve the function of the joints and ligaments. Osteopathic manipulation, strengthening exercises and prolotherapy may be beneficial to improve ligamentous laxity and potentially decrease or delay the recurrence of somatic dysfunction in patients with CMT. Prolotherapy is a method of strengthening ligaments by injecting an irritant solution in small amounts directly into the joint. The effectiveness of prolotherapy has been well documented in animal studies such as by Liu et al. in rabbits.[6] The use of prolotherapy in the SI joint has shown positive results in clinical trials by Cusi et al.[7] Prolotherapy may be an effective approach to treating ligamentous laxity[8] and potentially more effective when combined with exercise, OMT, and postural realignment to prevent further strain of the musculoligamentous system.

Using an osteopathic approach to treating areas of somatic dysfunction to correct damaging compensatory patterns associated with CMT may help improve the quality of life of these patients. Clinically, complex interactions among the unity of mind, body and spirit influence both the patient's level of distress and mental health, as well as disease and illness-related responses.[9] Addressing the chronic nature of the disease, and educating the patient on reasonable goals for treatment, may help improve overall outcomes for management of CMT.

Conclusions

Currently, treatment for CMT patients includes a comprehensive, multidisciplinary approach with neurologists, physiatrists, orthotists, orthopedic surgeons, and physical and occupational therapists.[10] Osteopathic manipulation may be an important adjunct to management of patients with CMT. Osteopathic approach for postural care consists of patient education, OMT, exercise and sometimes orthotic devices.[11] These concepts overlap with the recommendations in other literature and the osteopathic focus should be added to the multidisciplinary approach to treat peripheral neuropathic disease.

Summary

Overall, management of CMT includes evaluation of the extent of the patient's disease and his or her compensatory mechanisms to determine the level of treatment most appropriate. Application of osteopathic principles and manipulative medicine may be an excellent adjunct to caring for a patient with CMT as observed in this case study. Research has shown that a prominent feature of CMT is the clinical evidence of a gait disorder. Treatment plans often include follow up with a neurologist to monitor any changes or progression of the neuropathy, orthotics, physiotherapy and surgery for more severe cases. Although there is little specific osteopathic research on treatment for patients with CMT, osteopathic physicians may apply their understanding of biomechanics to help treat CMT patients.

Future research may look into applications of osteopathic manipulation for management of the gait changes associated with CMT, delay of progression of the degenerative changes, and the effects of OMT on different degrees of dysfunction associated with CMT. Understanding gait mechanics, the compensatory mechanism and using osteopathic manipulative treatment may be beneficial to correct somatic dysfunction associated with CMT. The osteopathic physician's awareness and appreciation for the slow deterioration of this disease and the patient's need for dynamic care may lead to better treatment and improved quality of life for people with Charcot-Marie Tooth disease.

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From the Archives Continued from page

eminently one of our most useful members for many years, was President that year, and Chairman of Committee on Education for the following year. Drs. Irene Harwood Ellis, M. F. Hulett, Secretary and Treasurer, respectively of the national organization, E. C. Pickler, O. J. Snyder, W. B. Davis, T. L. Ray, all afterward active officially in our national association management, I first met at that meeting.

I have always been thankful that my first impressions of Dr. Still were gained when he was in his prime, physically and mentally. His age then was about seventy-two. He had passed through the veritable struggle for existence. He had come to be acknowledged and acclaimed by his townsfolk where so recently he had been held in suspicion and doubt. The dread of want and dependence had been entirely removed; prosperity was his, and above all the child of his brain, that which he had slaved for and nurtured as a mother does a weakly babe, that which all except his faithful helpmate condemned and loathed as an unholy thing, was accepted by the world, which was beating paths from its four quarters to his door.

All through the ages men have paid the price for being different— in religion, in science, and now in the healing art. In the early years many went to their death, others were persecuted until they recanted. Fortunately for him, in Dr. Still's earlier days the world, though no more charitable, was more law-abiding, so the punishment administered to him did not kill the body, but well nigh crushed his sensitive soul. God be praised that he lived to see it all changed and that he had those many years, free from struggle, with not a physical care or concern; time to meditate, time to enjoy his children and grandchildren and friends; time to receive expressions of gratitude from thousands restored to happiness through what he had done; time to rest the wearied body and exercise the agile mind. Whatever concept each of us may have of the future, we all will agree on the recompense and the glory of such a transition period.

Plan to attend the AAO Program at the 2009 AOA Annual Convention and Scientific Seminar in New Orleans, Louisiana

Registration and housing is now open for the AOA's 114th Annual Convention and Scientific Seminar, which is taking place on November 1 – November 5, 2009 in New Orleans, Louisiana. Visit http://www.do-online.org/ to register for the convention and to reserve your room at the official Convention Hotels. Hotel rates are guaranteed until September 18, 2009 Advance Convention registration online, mail, or fax, must be completed by October 2, 2009 ; registrations received after this date will be held for pickup onsite. Please be sure to REGISTER AS AN ACADEMY MEMBER since the AAO's only revenue from the Convention accrues from attendees who check the AAO on their registration forms. We look forward to seeing you in New Orleans.

A retrospective study of decreased workers' compensation claims and cost at Downey Regional Medical Center secondary to the free Osteopathic Manipulative Medicine Resident Clinic for employees

Rebecca E. Giusti

Hypothesis: We believe that the free osteopathic manipulative medicine (OMM) Clinic for employees at Downey Regional Medical Center (DRMC) has resulted in lower workers' compensation fees for the medical center and less claims overall because of ease of access and early treatment of musculoskeletal complaints before symptoms necessitate a worker's compensation claim. Based on the data presented in this research we can conclude that a prospective study is needed. Not only would this study help the hospital financially; employee health and satisfaction would also increase.

Context: In 2006, the administration of DRMC reported an overall decrease in the cost of workers' compensation claims. They believed this decrease was in direct correlation with the increased use of the Resident run free OMM Clinic

Background: Employees of a medical center are at high risk for repetitive type injuries such as carpal tunnel syndrome, low back pain, and cervicalgia secondary to the nature and requirements of their jobs as nurses, OR techs, and secretaries/ administrative work. They are also at risk for strains and sprains secondary to slip and fall type injuries. DRMC has an AOA approved residency program for both Family Medicine and a +1 neuromusculoskeletal/ osteopathic manipulative medicine (NMM/OMM) Year. The OMM is performed by Doctors of Osteopathy in their 2nd and 3rd years of residency, and by the +1 NMM/OMM residents. At DRMC, a free OMM clinic is offered to all employees and is capable of treating a wide variety of problems, including many workers' compensation type injuries. However, prior to 2006, employees with a workers' compensation claim could not be seen in the OMM clinic per workers' compensation protocol.

Methods: To prepare for a retrospective study we have reviewed all of the OMM clinic charts since 1998 in order to determine the major type of injuries treated in the OMM clinic. We reviewed the usage of the OMM clinic by quantifying the number of patients seen in the clinic from 1998 to 2006. Next we reviewed the major workers' compensation nature of claim over the past several years. We also determined the average cost per workers' compensation claim to the medical center and the ultimate cost per nature of claim to the medical center. There is a case report included in this paper to show how dramatically the OMM clinic may benefit both the medical center financially and the employees' overall health and well-being.

Results:

1) OMM clinic chart review:

Usage: The first measure we took in compiling our data was to accurately determine how much usage the OMM clinic was getting and how many patients could be seen per week. The number of patients seen in the OMM clinic has doubled since 1998 to September of 2006. In 1998 a total of 49 patients were recorded as having been seen. This is attributed to very few residents being encouraged to participate in this clinic and therefore fewer time slots available for the employees. This program was not widely publicized at the time, and therefore fewer employees knew of its existence. From January 2006 to September 2006 a total of 100 employees were seen. From 1998 to September 2006 a total of 332 employees have been seen in the OMM clinic (Table 1).

Table 1

Employees seen at the DRMC Free OMM Clinic Years 2003 - 2006

Year	Number of Employees Seen
1998	49
1999	64
2000	50
2001	27
2002	38
2003	55
2004	65
2005	86
2006	100

From 1998- 2006, the number of residents participating in the OMM clinic has also increased substantially from 2-3 to approximately seven. Each resident is assigned one half day a week in the OMM clinic. This amounts to about 3.5 days of OMM clinic per week. Each half day is assigned 4 slots and therefore 28 employees can be treated per week.

Nature of complaint: Spinal pain is very common in the general population and is a common cause of disability and work loss. Low back pain alone resulted in 150 million lost working days in 1993.[4] Over a working lifetime, 80 % of all workers will have at least one episode of disabling low back pain. [6, 7] DRMC is no exception to this rule.

A total of 332 charts were reviewed from 1998 to September of 2006. Back pain and cervicalgia were the two most common diagnoses in the chart review averaging about 95% of the total reasons employees sought care at the OMM clinic. Back pain was the most common complaint affecting about 54% of employees. Low back pain was the most commonly reported type of "back pain", representing 60% of the total back pain complaints. Upper back pain represented 23% and mid back pain, about 10%. There was also a nonspecific diagnosis of "back pain" that represented 7% of the total back pain complaints.

Cervicalgia affected 41% of the employees. Per review in the charts, this was due to "stress at work", poor workstation ergonomics, and patient handling.

The third most common affliction was shoulder/upper extremity pain. 44% of employees had this complaint. "Shoulder pain" represented 62% of this category. Other diagnoses in this

Downey Regional Medical Center Table 2[4]
Workers' Compensation Claim Breakdown
Incident Year 2003

Nature of injury	Count	Total Cost	Ultimate Cost	% Count	% Total Cost
Strain	**53**	**$726,126**	**$922,906**	**60.9%**	**63.3%**
Sprain	**10**	**$93,427**	**$118,746**	**11.5%**	**8.1%**
Contusion	7	$12,542	$15,941	8.0%	1.1%
Fracture	3	$143,014	$181,771	3.4%	12.5%
Cumulative Trauma	3	$76,928	$97,776	3.4%	6.7%
All Other Specific Injuries NOC	2	$315	$400	2.3%	0.0%
Mental Stress	2	$30,381	$38,614	2.3%	2.6%
Laceration	2	$592	$752	2.3%	0.1%
Vision Loss	1	$3.313	$4,210	1.1%	0.3%
Conjunctivitis	1	$608	$772	1.1%	0.1%
Multiple Injury-Physical & Psychological	1	$58,255	$74,042	1.1%	5.1%
Burn	1	$516	$656	1.1%	0.0%
Electric Shock	1	$960	$1,220	1.1%	0.1%
2003 Total	87	$1,146,976	$1,457,806	100.0%	100.0%

Downey Regional Medical Center Table 3[4]
Workers' Compensation Claim Breakdown
Incident Year 2004

Nature of Injury	Count	Total Cost	Ultimate Cost	% Count	Total Count
Strain	**33**	**$394, 940**	**$552,916**	**41.3%**	**88.3%**
Sprain	**12**	**$33,232**	**$46,524**	**15.0%**	**7.4%**
Contusion	10	$352	$493	12.5%	0.1%
Inflammation	4	$3,032	$4,245	5.0%	0.7%
No Physical Injury	3	$66	$93	3.8%	0.0%
Laceration	3	$1,964	$2,749	3.8%	0.4%
Puncture	2	$40	$57	2.5%	0.0%
Dermatitis	2	-	-	2.5%	0.0%
Foreign Body	2	$169	$236	2.5%	0.0%
Mental Stress	2	$11,096	$15,535	2.5%	2.5%
Burn	2	$229	$320	2.5%	0.1%
All Other Specific Injuries, NOC	1	-	-	1.3%	0.0%
Multiple Physical Injuries Only	1	-	-	1.3%	0.0%
Contagious Diseases	1	$730	$1.022	1.3%	0.2%
Carpal Tunnel Syndrome	1	$1,664	$2,329	1.3%	0.4%
Bite/Sting	1	-	-	1.3%	0.0%
2004 Total	80	$447,515	$626,520	100.0%	100.0%

Calendar Year	2003	2004	2005	2006
# of claims	87	82	85	100
Value at the end of each CY	$ 834,906	$371,731	$327,134	$448,011
Present Value	$1,146,976	$447,781	$699,905	$448,011
Projected "Ultimate Cost"	$1.254,792	$521,665	$946,272	$973,528
Age of claim at time of valuation	48 months	36 months	24 months	12 months
Loss Development Factor (*Kemper CA specific LDF*)	1.094	1.165	1.352	2.173

Downey Regional Medical Center Table 4[4]
Workers' Compensation Claim Breakdown
Incident Year 2005

Nature of injury	Count	Total Cost	Ultimate Cost	% Count	% Total Cost
Strain	**42**	**$563,108**	**$967,420**	**43.3%**	**80.5%**
Contusion	17	$56,256	$96,648	17.5%	8.0%
Foreign Body	6	$2,170	$3,728	6.2%	0.3%
Puncture	5	$1,404	$2,413	5.2%	0.2%
Multiple Physical Injury Only	4	$25,476	$43,767	4.1%	3.6%
All Other Occupational Dz	3	-	-	3.1%	0.0%
Sprain	**3**	**$34,435**	**$59,160**	**3.1%**	**4.9%**
Laceration	3	$811	$1,394	3.1%	0.1%
Infection	3	$381	$655	3.1%	0.1%
Cumulative Trauma	2	$8,667	$14,891	2.1%	1.2%
No Physical Injury	2	$1,378	$2,368	2.1%	0.2%
Bite/Sting	2	-	-	2.1%	0.0%
Fracture	1	$2,345	$4,028	1.0%	0.3%
Allergic Condition	1	-	-	1.0%	0.0%
Mental Stress	1	$3,352	$5,759	1.0%	0.5%
Burn	1	-	-	1.0%	0.0%
Dermatitis	1	$20	$34	1.0%	0.0%
2005 Total	97	$699,805	$1,202,265	100.0%	100.0%

Downey Regional Medical Center Table 5[4]
Workers' Compensation Claim Breakdown
Incident Year 2006

Nature of Injury	Count	Total Cost	Ultimate Cost	% Count	% Total Cost
Strain	**40**	**$290,465**	**$790,064**	**39.6%**	**64.9%**
No Physical Injury	20	$48,503	$131,929	19.8%	10.8%
Contusion	14	$41,206	$112,081	13.9%	9.2%
Laceration	8	$6,975	$18,972	7.9%	1.6%
Sprain	**5**	**$2,494**	**$6,785**	**5.0%**	**0.6%**
Infection	4	$12,077	$32,849	4.0%	2.7%
Fracture	3	$19,721	$53,641	3.0%	4.4%
Foreign Body	2	$537	$1,460	2.0%	0.1%
Bite/Sting	1	$1,501	$4,084	1.0%	0.3%
Cumulative Trauma	1	$16,580	$45,098	1.0%	3.7%
Nausea/ Vomiting	1	-	-	1.0%	0.0%
Concussion	1	-	-	1.0%	0.0%
Hernia	1	$7,415	$20,168	1.0%	1.7%
2006 Total	101	$447,474	$1,217,130	100.0%	100.0%
Grand Total	**365**	**$2,741,769**			

Downey Regional Medical Center Table 6
Workers' Compensation Claim Breakdown
Incident Year 2003-2006

Incident Year	% of Total Injury	Ultimate Cost	Total Ultimate Cost	% of Total Ultimate Cost
2003	72%	$1,041,652	$1,457,806	71%
2004	56%	$559,440	$626,520	95.7%
2005	46.4%	$1,026,580	$1,202,265	85.4%
2006	44.6%	$796,849	$1,217,130	65.5%
Total		**$3,424,521**		

area included carpal tunnel syndrome, "paresthesias of the upper extremity", "upper extremity (wrist, forearm, elbow) pain", epicondylitis, "scapular pain", adhesive capsulitis, impingement syndrome, and rotator cuff tear.

The fourth most common affliction was lower extremity problems which affected 31% of the patients. This category included "lower extremity (ankle, knee, thigh, foot) pain, hip pain, sciatica, lower extremity radiculopathy, "buttock pain", groin pain, hamstring pain/ tightness, and plantar fascitis.

Other complaints that employees were treated for included: migraines, tension headaches, sinusitis, pregnancy and postpartum, "rib pain", TMJ, chronic constipation, Meniere's disease and cluster headaches.

Work-related symptoms: 25% of employees treated in the above time period had a documentation of an association between their work and their symptoms for which they sought treatment in the OMM clinic. However, this lack of reporting may be due to lack of protocol or space provided on the OMM Clinic SOAP note to document such an association.

Review of workers' compensation:

Most Common Claims: In most facilities, the top two claim causations are slip/fall injuries and patient handling injuries. These generally represent > 55-60% of all claims. Generally materials handling injuries (i.e. push/pulling/lifting carts of trash or linens or boxes), repetitive motion injuries (i.e. upper extremity disorders associated with excessive keying or poor workstation design) and injuries resulting from the employees being struck by or against an object make up an additional 25-30%.[1]

Cost of actual workers' compensation:

In general, despite the high incidence of needlestick and blood exposure incidents, few of these incidents are reported as claims and few dollars are associated with them. The dollars associated with claims vary based on the post injury protocols the organizations have in place, and the state in which the injury occurs.

The present value of Average Patient Handling claims in California for a three year period valued is about $10, 621, meaning that the expected "ultimate cost of those same claims when all are closed" is expected to be about $31,862/ claim! The expected cost/claim for slip/fall injuries are usually slightly less (about 10-25% less).[1]

DRMC is self-insured and therefore is directly responsible for paying for its workers' compensation experience and ensuring that it has adequate coverage in a self insured retention to cover any outstanding liabilities.[2]

Estimated cost to DRMC in lost days/productivity related to worker's compensation:

The actual cost of the claim is not the only expense of workers' compensation claims. Workers' compensation claims result in what is called a "multiplier effect". The multiplier effect encompasses all of the indirect costs accrued by one claim and they are estimated at 2-8 times the direct costs and are known as the "ultimate incurred cost".

Indirect costs include; the cost of lost days, the cost of the registry or temporary personnel needed to fill the positions that were left vacant, the cost of additional overtime filled in by other workers due to a vacancy in the department and the work demands, the cost of continued benefits, the cost of hiring replacements, the coworker's lost productivity due to temporary staff (time taken to make up for what temp does not do or redoing effort of the temp), the coworker's lost productivity due to vacant position (productivity decline due to vacancy, time spent working short or on a different assignment or floor), and the supervisor's lost productivity due to injury and vacancy. The last two factors are estimated to be 10% each of the coverage hours provided by coworker by the Nursing Executive Center Practice Brief 2001- "Preserving a Scare Resource: Reducing Nurse Injuries in an Era of Shortage."[2]

Breakdown of workers' compensation claims by nature of injury and cost:

Discussion:

How the OMM clinic could impact the number/cost of workers' compensation Claims:

As discussed above, the major reason most employees are seen at the free OMM Clinic are for strain/sprain type injuries; low back pain, cervicalgia, shoulder or upper extremity injuries. In a medical center setting many employees are subjected to administrative duties involving keyboarding, computer work and patient handling; both of which can result in strain/ sprain type injury of the back, neck and arms. These are all potential workers' compensation claims. Studies have shown that once chronicity of an injury has been established, the prognosis for return to normal health, function and productivity is poor, regardless of the method of intervention. The cost-effectiveness of interventions to prevent chronicity depends on early identification of the problem and immediate steps taken to resolve and prevent the injury.[6, 7]

The OMM clinic is easily accessible to all employees as it operates 3.5 days a week. Employees can be seen for a particular complaint such as neck pain as soon as the symptoms start. If needed, a work station evaluation can be done after that treatment. User friendly exercises are generally given to the employees to help relieve and prevent the given injury in addition to the treatment and follow-ups are scheduled as deemed by the physician present.

Every time a patient is able to receive early treatment in the OMM clinic we are helping to prevent a potential workers' compensation claim. How could this impact the medical center financially?

As represented in the figures above, in 2003, strain/sprain injuries represented 72% of total injury and 71% of the total ultimate cost of $1,041,652. In 2004, they represented 56% of the total count and 96% of the total ultimate cost equaling $559,440. In 2005, strain/sprain injuries comprised 46.4% of the total count and 85.4% of the total ultimate cost of $1,026,580. In 2006, they comprised 44.6% of the total count and 65.5% of the total ultimate cost at $796,849. What is also interesting to note is that there has been a decrease in the total count of employees claiming workers' compensation strain/ sprain injuries from 2003 to 2006 as the number of employees seen in the OMM clinic has increased during that same time

period. This may represent a preventative effect of the osteopathic manipulative medicine on filing workers' compensation claims for the nature of injury. Employees are being treated with a resolution of their symptoms, or at the very least, are enabled to perform their duties to a degree of comfort that has led them not to have to file a workers' compensation claim.

One study concluded that patients presenting to their General Practitioner with subacute spinal pain reported greater improvement in short-term physical and longer-term psychological outcomes if treated in a primary care-based osteopathy clinic in addition to their usual General Practitioner care.[4] Another study by Atcheson et al showed a significant reduction in workers' compensation cost with in-house musculoskeletal specialists versus the patients being referred out for specialty consultations using a discounted fee scheduling. The patients seen by the in-house specialists had a reduced average length of duration claim; 8 months compared to 14, 63% lower claim costs and their cases closed 6 months faster than the out-referral patients. The authors attributed the lower costs in the in-house specialist group to the "patients having more rapid access to musculoskeletal specialists, an efficient source of experience, and an expertise in the management of work-related musculoskeletal injuries. They also attributed the lower costs to lack of treatment delays…"[8] DRMC already has its musculoskeletal specialists built in with its Osteopathic residents running the OMM Clinic.

Case study: A presentation of how osteopathic manipulative medicine provided at the free OMM Employee Clinic may decrease costs of workers' compensation claims:

Chief complaint: workers' compensation claim for carpal tunnel with "achiness" in both 4th and 5th digits and thumbs and bilateral wrist pain x 6 months.

HPI:

52 year old Caucasian female with a recent history of gastritis on Nexium daily was seen in the OMM clinic with a workers' compensation claim for bilateral carpal tunnel syndrome. The patient complained of "achiness" in bilateral 4th and 5th digits and thenar eminences that was exacerbated by computer work. She denied paresthesias, numbness, or tingling. She denied cervicalgia, headache, and bruxism that she was aware of. She denied low back pain. The patient stated that she had been experiencing bilateral wrist, upper extremity, and hand "achiness" for "years" but as she was in an administrative position, she had been reluctant to seek help for the problem or file a workers' compensation claim. However, in May 2006 finally she experienced such significant wrist pain she had difficulty working and was forced to file a workers' compensation claim on May 26, 2006. Per protocol, she was sent to see a workers' compensation physician. He prescribed naproxen daily, 4 weeks of physical therapy, and splints for both of her hands, thumbs, and arms. He also told her at this first visit that without question she was going to require surgery on both upper extremities to correct the problem. He also stated that this would be a lifetime problem and that she would not be able to return to her same job ever again. This along with the thought of surgery devastated the patient. However, she took the naproxen, did the PT and had her workstation evaluated and arranged by the physical therapy department in charge of positioning work stations. The patient had an EMG performed July 19, 2006 that confirmed the diagnosis of mild to moderate carpal tunnel syndrome originating from the cubital fossa areas.

The patient did not respond to the first 4 weeks of PT and so was prescribed an additional 4 weeks. The workers' compensation physician also referred the patient to an orthopedic surgeon for an evaluation. This physician stated that the patient would require surgery in order to resolve her symptoms and put in an authorization for the procedure. He also gave her elbow splints, but the patient had difficulty using them as they were so cumbersome and caused her more pain. In October 2006 the patient began to experience symptoms consistent with gastritis and esophagitis. She saw her primary care physician who felt these symptoms may be related to her naproxen use for the carpal tunnel syndrome and recommended that she discontinue its usage. He referred her to GI who she saw in December 2006. He prescribed Nexium 40 mg daily and recommended an endoscopy and colonoscopy. Meanwhile the patient had still not obtained any relief from her carpal tunnel symptoms but was reluctant to undergo bilateral carpal tunnel surgery which ortho was highly recommending. In December 2006, the orthopedic surgeon stated he was suspecting "Martin- Gruber anastomosis" and stated her symptoms would not resolve without the surgery. He state that she should decide within a month if she wanted to go forward with the procedure or not. In the meantime, the patient talked to the DME at Downey Regency Medical Center wondering if osteopathic manipulative medicine may be able to help her. The answer was affirmative and the patient obtained permission from the administration to be seen in the OMM clinic.

Past medical history: Recent history of GERD secondary to naproxen use due to bilateral wrist pain.

Past surgical history: Tonsillectomy at age 3.

Past trauma history: The patient was in an MVA in the year 2000. Her car was totaled when a big rig hit her Nissan. Her car slammed into the center divider and bounced off of it three times. She was wearing her seatbelt but had no side impact airbags. She slammed her head against the side window frame and had a large contusion from the seatbelt. No fractures were sustained and the patient was not hospitalized.

Allergies: 1) Vicodin- palpitations

2) Codeine- severe nausea

Medications: Nexium 20 mg daily for GERD.

Social history: The patient doesn't smoke and has no history of drug use. She drinks occasionally only at social events. She is single and has one daughter who is married and two grandchildren. She works as the Director of Health Information at DRMC.

Habits: Enjoys walking and swimming daily and spending time with her grandchildren.

Review of systems:

General: Patient denies fever, chills, night sweats. Has a good appetite. No recent abrupt weight loss or gain.

HEENT: Patient denies migraines. She does occasionally get

tension headaches from working on the computer with "floaters". She would take Alleve to relieve the headaches. Denies sore throat, tinnitus, rhinorrhea.

CV: Patient denies chest pain, history of myocardial infarction or hypertension. Denies hypercholesterolemia at this time.

Lungs: She denies history of pneumonia, asthma, dypsnea on exertion, shortness of breath or paroxysmal nocturnal dypsnea.

GI: The patient states she has a history of GERD for which she is taking Nexium. Otherwise she denies abdominal pain, nausea or vomiting. States she needs to get a colonoscopy done as well as an endoscopy to evaluate her GERD.

GU: The patient is G1P1 and had a NSVD. She is now menopausal. Her LMP was over 2 years ago. Her last pap smear and mammogram were done 10/06 and were both within normal limits.

Heme/Onc: No history of cancer or anemia.

Endocrine: No history of DM II, thyroid problems, heat or cold intolerance.

Neuro: EMG results as stated above. No history of syncope or CVA.

Physical exam:

Vitals: pulse: 70 respirations: 14 temperature: 97 BP: 100/82

HEENT: NCAT, PERRLA, EOM intact bilaterally. TMs intact bilaterally. The nares are patent without discharge, pink turbinates. The oropharynx is pink and moist without erythema or postnasal drainage.

Heart: Regular rate and rhythm without murmurs, rubs or clicks. No JVD noted.

Lungs: CTAB.

Neuromusculoskeletal exam:

Cranial: Not assessed on first visit.

Cervical: OA compression. OA ESRRL. Hypertonicity noted on left side C2-C4. C4 ERRSR. C5 ERLSL. Bilateral supraclavicular fossa restriction.

Thoracics: Bilateral scapular restriction at medial and superior borders. T3 FRLSL. T8 FRLSL. The thoracolumbar junction is extended and rotated right with a strong pull to the attachments of both crus at L1-2.

Lumbar/ Sacrum: Lumbosacral compression with right SI restriction.

Ribs: Bilateral hemidiaphragm restriction, R>L.

UE: Bilateral radial and ulnar head Jones Counterstrain points noted. Jones Counterstrain point noted left short head of bicep insertion and first carpal bone. Tenderness noted over left first metacarpal. Decreased abduction in bilateral thumbs. Bilateral Jones Counterstrain CMT1 points found in thenar eminences.

Clinical impression:

1) Bilateral ulnar plexopathy
2) Carpal Tunnel Syndrome
3) Somatic Dysfunction: Cervicals, thoracics, ribs, lumbars, sacrum, bilateral upper extremity

Treatment: 1) OMT- MFR- Bilateral scapulae release, bilateral supraclavicular fossa release, lumbosacral decompression, bilateral SI release, general unwind of bilateral upper extremities, suboccipital release.

S/CS- Bilateral radial and ulnar heads, bilateral CMT1 points, left short head of bicep insertion, and left first carpal and metacarpal bones.

BLT- Bilateral hemidiaphragm release.

Level of pain prior to treatment: 5-6/10

Level of pain post treatment: 0/10

Exercises: The patient was instructed to lie supine and lengthen posterior cervical by bringing her chin towards her throat 5 times. She then was instructed to rotate her head slowly side to side still supine 5 times. She was instructed on how to do a proper pelvic tilt spine and was asked to do this at least 5 times a day with diaphragmatic breathing.

Work station: The patient's work station was reevaluated and the necessary ergonomic changes were made to improve her posture at the work station.

Course of treatment: The patient's first visit to the OMM clinic was 12/13/06 and is described as above. Post treatment, she had complete resolution of her symptoms for which she had been recommended to have surgery.

The patient was seen one week later with the complaint of "achiness" in her bilateral thumbs with radiation to her elbows, but she remarked that she was significantly better after her first treatment. Her pain was 3/10. She also described feeling "tightness" with cervical rotation and "tingling" in her 4^{th} and 5^{th} digits only when leaning on her elbows. She was found to have somatic dysfunction of her cervicals, thoracics, and bilateral upper extremities and was treated with muscle energy, myoascial release, and strain/counterstrain. She had complete resolution of her symptoms at post treatment. A Fulford exercise for the bilateral upper extremities (the patient stands with both arms in horizontal abduction at shoulder height and turns one palm up and the other down towards the floor for 3-5 breaths and then switches) and child's pose were added to the patient's exercise regime.

The patient had her third visit to the OMM clinic two weeks later. At this time her only complaint was bilateral "thumb pain" which was a 1/10. She stated that the pain in her elbows and forearms was resolved. She stated that even though she had bilateral thumb pain, it was much improved since the first visit. She was doing her exercises faithfully and discussed the possibility of an endoscopy to address her GERD. At that time she was diagnosed with somatic dysfunction of the thoracics, bilateral upper extremities, lumbars, and ribs. She was treated with special attention to the diaphragm in light of the GERD.

The patient's fourth visit was five days later. She had been taking down Christmas decorations and felt a "pulling sensation" through both of her forearms. She admitted to "over-doing it" when taking down the decorations. She was found to have somatic dysfunction of the cranium, cervicals, thoracics, lum-

bars, sacrum, and bilateral upper extremities. She was of course treated osteopathically and given thumb circles and thumb to finger touches daily.

At the patient's fifth visit she complained of bilateral thenar eminence pain and still had a slight "pulling" sensation in both forearms, 1/10 on the pain scale. She was diagnosed with somatic dysfunction of the thoracics, lumbars, and bilateral upper and lower extremities. She also complained of pain on the plantar surface of her right foot. She was treated for that and shown stretches specific for plantar fascitis.

At the patient's sixth visit, she had seen the workers' compensation physician two days prior for a reevaluation of her symptoms. Although she was pain-free, he still recommended cubital surgery for the patient's carpal tunnel syndrome. The patient informed the workers' compensation physician that she was receiving Osteopathic Manipulative Treatment, was pain free, and wished to be released from worker's compensation. However, the workers' compensation physician refused to release her and the patient was told to return in 6 weeks to ensure that her symptoms were completely resolved. The patient continued to be seen in the OMM clinic for "tune-ups" and for plantar fascitis which has since resolved. As of the patient's 5th visit to the free OMM clinic at DRMC, her symptoms related to workers' compensation were completely resolved. This was achieved in a period of one month; 12/13/06 to 1/17/07. The patient's supervisor finally had to request that the patient be released from workers' compensation secondary to complete resolution of her symptoms on March 26, 2007, as the workers' compensation physician continued to deny her release.

In conclusion, the patient was seen and treated for six months for carpal tunnel syndrome with physical therapy and NSAIDs which ultimately gave her another problem; GERD without relief from her initial complaint. In one month, the patient received five Osteopathic treatments and was pain free without surgery, medication or further physical therapy expect for the simple exercises prescribed. Had she not been treated at the OMM clinic, she may have ended up with an unnecessary and expensive surgery that may not have resolved her symptoms. With conservative Osteopathic Medicine, the patient recovered fully without surgery in the period of one month and was extremely satisfied with her care.

Conclusion:

Up to this point many studies in workers' compensation have focused on reducing the cost of worker's compensation by implementing measures such as discounted fee schedules, bill repricing, limits on employee choice of health care provider, and the use of managed care.[8, 9, 10, 11] They have only taken a few steps such as "enhanced safety measures" and safety/ergonomic programs towards the *prevention* of workers' compensation.[11]

Previous to September 2006, DRMC employees on workers' compensation had a protocol in place to be treated for their injury. They were not allowed to be treated in the OMM clinic based on that protocol for those specific injuries. However, on examination of the data to date, it would seem that employees on workers' compensation for sprain and strain claims would benefit significantly from osteopathic manipulative medicine. There is sufficient evidence that the OMM clinic may significantly reduce and even resolve most sprains and strains, depending on the severity and duration of the injury, in a matter of visits. If employees are encouraged to visit the OMM clinic as soon as symptoms start they may avoid developing a work-related injury. As the OMM clinic is free to employees, this would have a large impact on both the financial burden of the hospital with respect to workers' compensation and be a significant force in the prevention of work-related injuries.

What is needed in light of this data is a prospective year-long to two-year long study with two arms; one that is concurrent and the second that has preventative criteria. In the first or concurrent arm; workers' compensation claims for sprain/strain type injuries should be directed to the OMM clinic after an initial evaluation by the workers' compensation physician and the appropriate diagnostic tests are performed. The visits to the OMM clinic should be labeled "Workers' Comp" for as long as that injury is being treated. The start date, diagnostic coding, treatment, and date that symptoms are resolved should be carefully documented as well as any further forms of treatment or testing that were needed (i.e. X-rays, medication, EMG). These patients should be followed by the administration as to the ultimate financial cost to the hospital. At the end date of the study we would evaluate the workers' compensation claim with the following criteria; diagnoses/ nature of injury, duration of injury, ultimate cost to the hospital, and patient satisfaction in terms of their care. We would compare the total cost and ultimate cost of the workers' compensation claim to the years previous to see if there is a downward trend in cost to the hospital in terms of sprain/strain injuries.

The second arm would be aimed at preventing an employee of ever reaching the point of filing a workers' compensation claim. In this portion of the study, employees who experience any type of repetitive type injury such as carpal tunnel syndrome, or low back pain (secondary to repetitive lifting) and material/patient handling type injuries would be encouraged to visit the OMM clinic as soon as possible. The physician in the OMM clinic would identify the chief complaint, activities or work duties that aggravate the complaint, would initiate the appropriate treatment, exercises, and work station evaluation, and arrange follow up visits as necessary and note if the employee did actually need to file a workers' compensation claim for the said injury.

The physician will carefully document the initial injury for each complaint. If the injury was sustained at the employee's home this will be documented and labeled in the chart as an "At Home Injury". All other employees treated for the above mentioned repetitive, sprain/strain type injuries can be labeled as "potential worker's compensation". This general anonymous data with the exception of the "At Home Injuries" would be released to the administration at the end of the fiscal year to see if there has been a decrease in; 1) the amount of sprain/strain injuries filed as workers' compensation and 2) the overall cost to the hospital in sprain/strain claims.

As shown in the discussion section, the hospital has spent over $3 million on sprain/strain injuries over four years; 2003-2006. Even if the OMM clinic could cut the sprain/strain injury claims in half, it could potentially save the hospital $279,720 to $520,826 a year in total ultimate cost. It would also decrease the cost of current workers' compensation strain/sprain claims.

As shown in the case study, the patient's workers; compensation symptoms resolved with one month of osteopathic manipulative medicine after six months of failed typical worker's compensation type care. That care had included two courses of PT, use of NSAIDs which ultimately gave the patient a new health problem: GERD, and she had been scheduled to have bilateral carpal tunnel surgery. Because of osteopathic manipulative medicine, the medical center was spared the expense of a bilateral surgical procedure, the patient was returned to full productivity within one month and she was extremely satisfied with her outcome.

This two-arm study will serve a multi-faceted purpose. It will show that with the free OMM clinic 1) the medical center will save money on the treatment of workers' compensation claims and thus may have increased funds for other projects that would benefit its staff, patients, and community, 2) the medical center will protect its employees proactively from on-the-job injury, 3) holistic rational care will be provided to its employees who do need to file workers' compensation claims and enable them to return to their jobs faster and safer than before. When employees feel that the facility in which they work has their best interest at heart, they are generally more productive, happier, and more likely to speak positively about that facility. This permeates the community as a whole and creates a higher quality facility with happier employees and ultimately happier patients.

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CME QUIZ

The purpose of the quiz found on page 30 is to provide a convenient means of self-assessment for your reading of the scientific content in the "A retrospective study of decreased workers' compensation claims and cost at Downey Regional Medical Center secondary to the free Osteopathic Manipulative Medicine Resident Clinic for employees"
by Rebecca E. Giusti, DO

Answer each of the questions listed. The correct answers will be published in the September 2009 issue of *The AAO Journal.*

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Contact FAO,P.O. Box 2025 Largo, Florida 33779
P: 727-581-9069

July 2-6, 2009: Osteopathy in the Cranial Field
South Pointe Hospital,
Warrensville Heights, OH 44122
Contact SCTF, Judy Staser P: 1-817-926-7705
JHS4116@sbcglobal.net

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August 28 - 30, 2009: Annual Seminar:
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