ATSU | National Center for Osteopathic Principles and Practice Education

Introduction to OMM for MDs and DOs

- May 20, 2024 – May 23, 2024 Kirksville, MO
- NCOPPE & KCOM

ATSU | A.T. Still University

FIRST IN WHOLE PERSON HEALTHCARE

Today's Schedule

8:00 a.m.	**Introduction to Osteopathic Principles and Practices** **Steven Gustafson, DO, FCAP, FASCP**
10:05 a.m.	Soft Tissue of the Cervical, Thoracic, and Lumbar Spine Tristan Glenn, DO Calibration of Manual Palpation Pressure Brian Degenhardt, DO
12:00 noon	Lunch 12:45 – 1:15 (optional) Tour of Museum of Osteopathic Medicine
1:30 p.m.	Counterstrain of the Thoracic Spine (posterior) Heather Bird, DO
3:35 p.m.	Segmental Diagnosis: Thoracic and Lumbar Spine Bill Strait, DO

ATSU

National Center for Osteopathic Principles and Practice Education

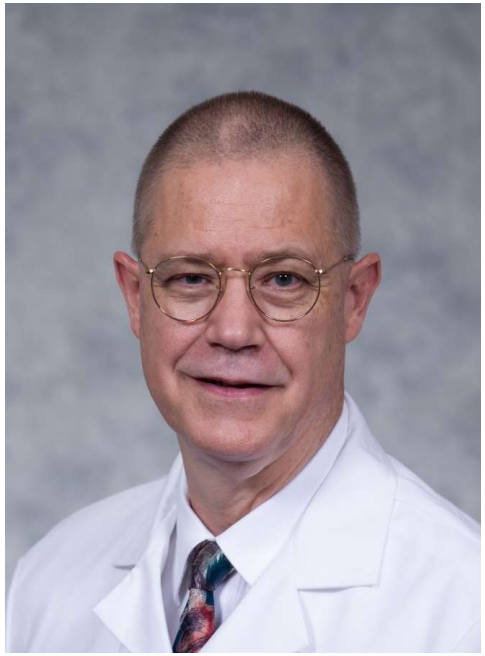
Introduction to Osteopathic Principles and Practices

Steven Gustafson, DO, FCAP, FASCP

Eric Snider, DO

– Presentation Preparation

Steven Gustafson, DO, FCAP, FASCP



Dr. Gustafson is a graduate of Des Moines University College of Osteopathic Medicine. He has completed his residency in pathology and subspecialty training in hematopathology, pediatric pathology, clinical pathology, and surgical pathology. Dr. Gustafson is a professor and lectures nationally and internationally on pathology and osteopathic manipulative medicine. His research interests include osteopathic medicine, cranial sacral therapy, and manual medicine practices compared to OMT. He works to improve medical education and clinical laboratory services in the third world. Dr. Gustafson serves as a board member of Education Congo's Medical School Committee and is a former president of the American College of Osteopathic Pathologists.

Eric Snider, DO

Eric Snider, DO, is an associate professor at A.T. Still University's Kirksville College of Osteopathic Medicine (ATSU-KCOM). He serves as the chairperson for the Osteopathic Manipulative Medicine department and as the program director for the Osteopathic Neuromusculoskeletal Medicine (ONMM) residency. Dr. Snider is board certified in Neuromusculoskeletal Medicine & Osteopathic Manipulative Medicine. He earned his Doctor of Osteopathy from the West Virginia School of Osteopathic Medicine (1999), and he completed his internship and residency at Northeast Regional Medical Center (1999-2002).

Speaker Disclosure Statements

The speaker(s) disclose that s/he has no relevant financial relationships with any organization producing, marketing, reselling, or distributing healthcare goods or services consumed by, or used on, patients relative to the content of this presentation.

Planning Committee Disclosure Statement

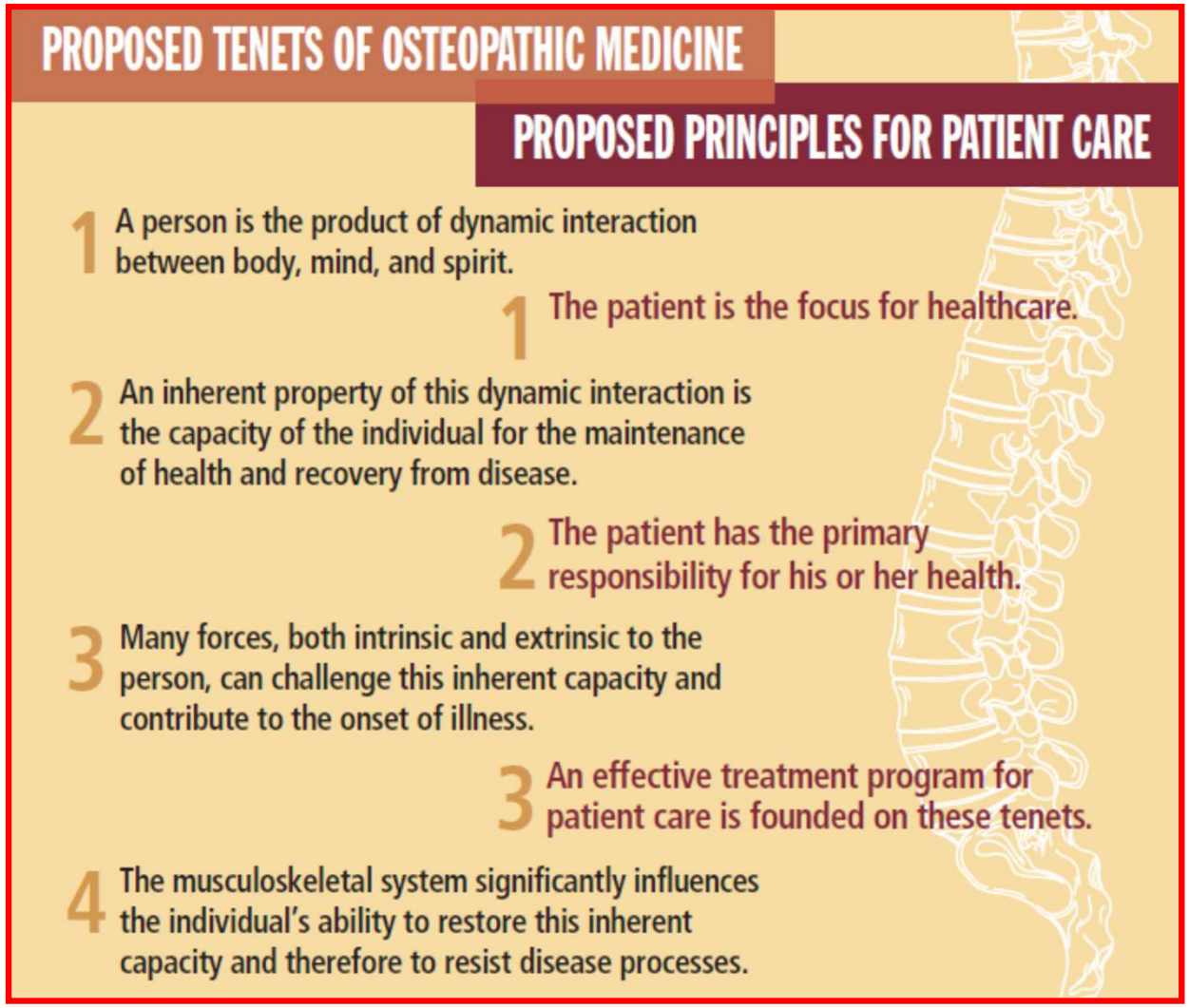
- The Continuing Education Steering Committee (CESC), Osteopathic Principles and Practice (OPP) Committee members, and planners/reviewers of this activity disclose that they have no relevant financial relationships with any organization producing, marking, reselling, or distributing health care goods or services consumed by, or used on, patients relative to the content of this presentation.
- The copyrighted materials available in this PowerPoint are for educational use only. Redistribution of copyrighted materials is not permitted.
- No discussion of off-label use and/or investigation used in this presentation.

Goals objectives

- Describe the Four Tenets of Osteopathic Medicine.
- Define Osteopathic Manipulative Treatment (OMT).
- Define somatic dysfunction.
- Describe the characteristics of direct OMT techniques.
- Describe the characteristics of indirect OMT techniques.
- Begin to palpate somatic dysfunction using the T.A.R.T. format

Four Tenets of Osteopathic Medicine

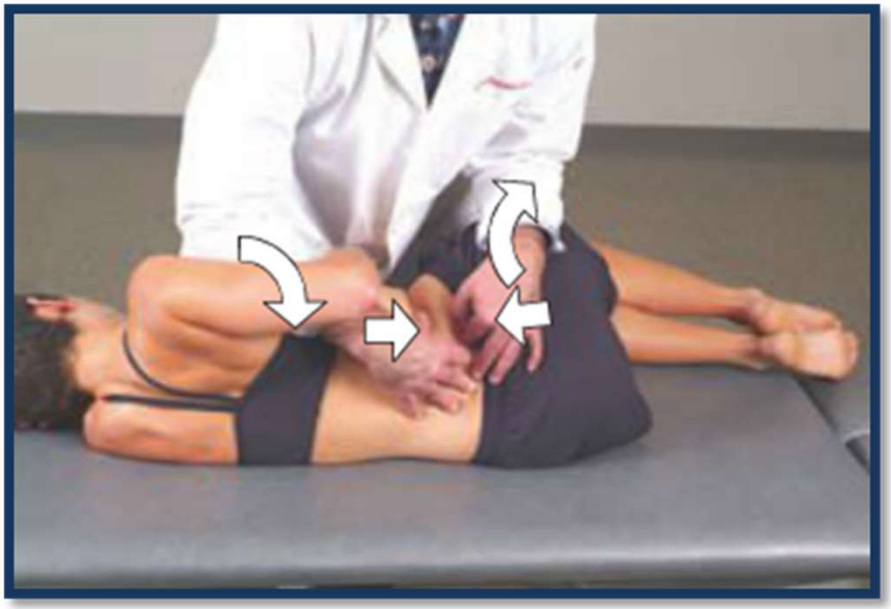
1. The mind, body & spirit are a unit.
2. The body is capable of self-regulation, self-healing, and health maintenance.
3. Structure and function are reciprocally interrelated.
4. Rational treatment is based upon understanding & implementing the other 3 tenets.



Rogers F, D'Alonzo G, Glover J, Korr I, Osborn G, Patterson M, Seffinger M, Taylor T, Willard F. Proposed tenets of osteopathic medicine and principles for patient care. J Am Osteopath Assoc 2002;102(2):63–65.

OMT – Osteopathic Manipulative Treatment

- The therapeutic application of manually guided forces by an osteopathic physician to improve physiologic function and/or support homeostasis that have been altered by somatic dysfunction.

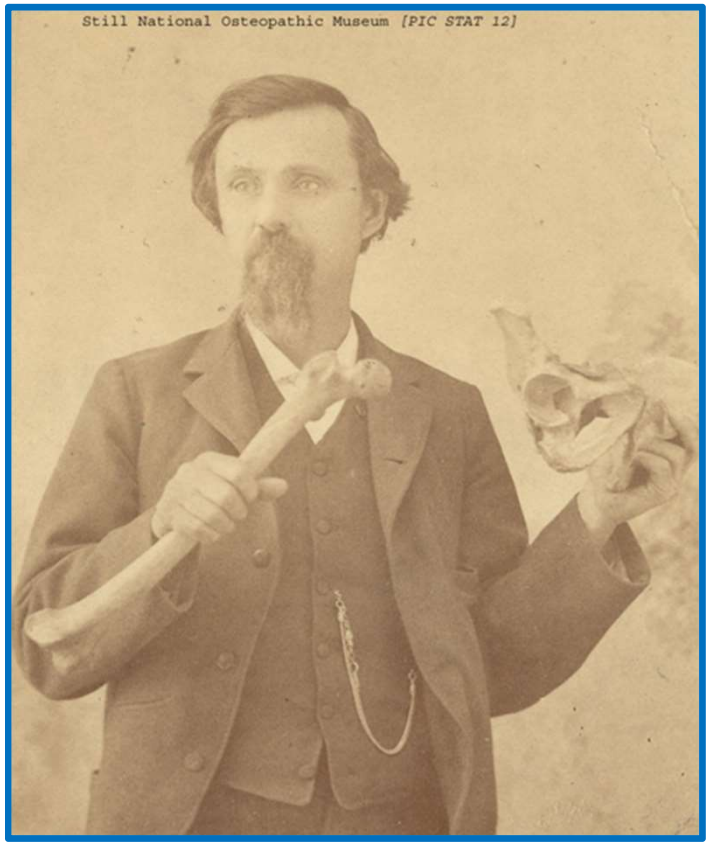


Osteopathic manipulative medicine: Goals

- Improve function and efficiency of movement through our environment.
- Reduce pain and discomfort.
- “The most any physician can do for a patient is to render operative, the forces within the body itself.”
  - A. T. Still

Osteopathic manipulative medicine: Goals

- “Any variation from health has a cause, and the cause has a location. It is the business of the osteopath to locate and remove the cause, doing away with the disease and getting health instead.”
  – A. T. Still



Definition: Somatic Dysfunction

- Impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodial, and myofascial structures, and their related vascular, lymphatic, and neural elements.

- Historically: Called, a Lesion, Still Lesion, Osteopathic Lesion.

Glossary of Osteopathic Terminology, 2011

Dr. Andrew Taylor Still on Cause of Somatic Dysfunction

- "If we have observed the perfect, harmonious work of health, we are now prepared to adjust the machinery of life by taking all embarrassments from blood- and nerve-supply that are caused or could be caused by strains, jars, and nervous shocks or wounds that are produced by change of season, climate, and physical injuries of all kinds, be they great or small.
- Your work is completed when you have adjusted the human body to the degree of perfection in which the God of Nature left it.
- This is the limit of your usefulness; do your work well and you will get the results sought.
- Never grow weary in well-doing; we have proven that God is true."

Page 207. Still, A. T.: The Philosophy and Mechanical Principles of Osteopathy. Reprinted, Osteopathic Enterprise, Kirksville, MO, 1986.

Necessity of knowing normal

- If you know normal, you can find abnormal.
- “As osteopathic machinists we go no further than to adjust the abnormal conditions back to the normal. Nature will do the rest.”

Dr. A. T. Still, The Philosophy and Mechanical Principles of Osteopathy, p. 33.

Diagnostic Criteria for Somatic Dysfunction

T.A.R.T. Criteria

Tissue texture abnormalities

Asymmetry of structure

Restriction of motion

Tenderness

Any one of which must be present for the diagnosis of somatic dysfunction

Indications for OMT

- Somatic Dysfunction is **the** indication for OMT
- OMT, is directed specifically at the treatment of somatic dysfunctions
- To enhance homeostatic mechanisms.
- The musculoskeletal system can be a major factor in maintaining homeostasis.
- Influence on Autonomic Nervous System, Sympathetic & Parasympathetic systems.

Absolute & Relative Contraindications to OMT

- **Absolute:** OMT carries significant risk of a serious adverse event that exceeds the expected benefit and should not be used.
- **Relative:** Caution should be used when OMT is performed because there may be a greater than usual risk of an adverse event.
  - May need to exclude treatment of specific body regions
  - May need to exclude certain types of techniques
  - Shared decision making with patient
  - One must understand of benefits vs risks
- Most absolute and relative contraindications to OMT are based on an understanding of anatomy, physiology, and pathophysiology and on the forces applied with a particular type of technique.

Cook CE. Orthopedic Manual Therapy: An Evidence-Based Approach. 2nd ed. New York, NY: Pearson; 2010.
Dagenais S, Haldeman S. Evidence-Based Management of Low Back Pain. London, UK: Mosby; 2011.

General Contraindications for OMT

- Lack of Consent, (verbal or written).
- Unstable condition that involves rapid life-threatening deterioration
- If performing OMT will delay definitive diagnosis and treatment of an urgent or emergent condition.
- Without performing an appropriate history and physical evaluation, including evaluation for somatic dysfunction.
- OMT should not be specifically applied to sites of unstable anatomy if the application of forces used with the technique presents a high risk of a deleterious consequence.
- OMT should not be used when the physician's skill level makes it likely they will apply a force that overwhelms the integrity of the tissues.
- Making changes that exceed the metabolic capacity of the patient's system to adapt (dosing).

Building Rapport While Evaluating and Treating Sensitive Areas

- Chaperone in the room as appropriate.
- Explain what you are going to do and why you are doing it before examining.
- Ask them to let you know if it is too uncomfortable or if they need you to stop.
- Tell them the names of the anatomy you are palpating:
  - Sometimes before you palpate it
  - Sometimes as you palpate it
- Tell them what you are finding throughout the exam.
- Communicate with the patient.

Adverse Event

Is any unfavorable and unintended sign (including an abnormal laboratory finding), symptom, or disease temporally associated with the use of a medical treatment or procedure that may or may not be considered related to the medical treatment or procedure.

Side effect – unintended, secondary effect of the intended effect; may be beneficial or harmful.

Side effect is no longer a recommended term.

NCI Thesaurus. Side effect (code C2861). National Cancer Institute. https://nciterms.nci.nih.gov/ncitbrowser/ConceptReport.jsp?dictionary=NCI_Thesaurus&ns=ncit&code=C2861. Updated June 26, 2023. Accessed August 10, 2023.

Adverse Events

Grade	Level	Classification	Description
1	Mild	Nonserious	The event is usually transient, does not typically interfere with activities of daily living, and requires no special treatment or intervention.
2	Moderate	Nonserious	The event impacts usual daily activities but is alleviated with simple noninvasive, therapeutic treatments. Laboratory evaluation indicates injury but without long-term risk or permanent harm.
3	Severe	Nonserious	The event requires intensive therapeutic intervention and interrupts usual daily activities. It may require brief hospitalization or prolong an existing hospitalization but does not result in a persistent or significant disability or incapacity.
4	Life-threatening or disabling	Serious	A medically significant event or its immediate sequelae, which places the patient at imminent risk of death or is associated with physical or mental disabilities that affect or limit the ability of a person to perform activities of daily living. The event may result in inpatient hospitalization or prolong an existing hospitalization.
5	Death	Serious	The event is associated with termination of life.

https://nciterms.nci.nih.gov/ncitbrowser/pages/multiple_search.jsf?nav_type=terminologies

See references at end of presentation.

OMT = Osteopathic Manipulative Treatment SM = Spinal manipulation n/d = Not Defined CVA = Cerebrovascular Accident

CATEGORY	WHAT	INCIDENCE
Treatment-emerging transient adverse events[1, 2, 3, 4] Non-serious Mild to moderate Grade 1 and Grade 2	Headache Stiffness / soreness Local discomfort in area treated Radiating pain / discomfort Fatigue / tiredness Nausea / vomiting Dizziness / imbalance Arm or leg weakness	Licciardone et al (2002): 8.6% of patients surveyed (n = 459) reported and attributed adverse reactions to OMT. Caigne et al (2004): 60.9% (n = 283) of patients surveyed (n = 465) reported at least one post-manipulative reaction following manual therapy. Senstad et al (1997): At least one reaction was reported by 55% of the patients sometimes during a course of treatments (SM) Leboeuf-Yde et al (1997): At least one reaction was reported by 44% of the patients during their treatment (SM) Hurwitz et al (2005): 30.4% (n = 85) of patients surveyed in the UCLA Neck Pain Study reported 212 adverse reactions following chiropractic care.

Onset and duration of reported adverse reactions [1]Caigne et al (2004) [2]Senstad et al (1997) [3]Leboeuf-Yde et al (1997) [4]Hurwitz et al (2005)

[1]Transient effects usually begins within 4 h of receiving treatment and typically resolve within the next 24 h (Caigne et al, 2004)

[2]Onset: within 10 min (17%), between 10 min and 4 h (47%), after 4 h (32%). Resolved: during day of treatment (72%), during day 2 (16%), during day 3 or later (7%)

[3]Onset: same day (58%), day 2 (32%). Resolved post-treatment: few hours after (21%), up to 24 h after (34%), between 24 h and 48 h (19%), more than 48 h (19%)

[4]Majority of symptoms began within 24 h of treatment, disappeared within 24 j of onset, and did not highly impact activities of daily living

Substantive complications: Reversible[5] Grade 3, if reversible	Disc herniation or prolapse Nerve root compression Fracture	Oliphant (2004): SM in treatment of lumbar disc herniation – clinically worsened herniation or cauda equine syndrome following SM estimated to be 1 in 3.7 million
Substantive complications: Non-reversible[6] Grade 4 and 5	Death Cerebrovascular accident Spinal cord compression Cauda equina syndrome	Rivett and Milburn (1996): incidence of neurovascular compromise within the range 1 in 50,000 to 1 in 5 million Dvorak and Orelli (1985): 1 in 400,000 (complications n/d) Patijn (1991): overall (n/d) rate 1 in 518,886 Klougart et al (1996): 1 in 0.9 to 1.3 million (CVA)

[5]no actual data on incidence do exist; these reversible complications has been published as case-reports in the indexed literature

[6]the true incidence of serious complications is not known as lack of treatment data (SM and patients) makes accurate statistics impossible

References:

Caigne B et al. How common are side effects of spinal manipulation and can these side effects be predicted? *Manual Therapy* 9 (2004) 151 - 156

Dvorak J, Orelli F. How dangerous is manipulation to the cervical spine? *J Manual Med* 1985; 2: 1 - 4

Hurwitz E et al. Frequency and clinical predictors of adverse reactions to chiropractic care in the UCLA neck pain study. *Spine* 2005; 30: 1477-1484

Klougart N et al. Safety in chiropractic practice, part 1: the occurrence of cerebrovascular accidents after manipulation to the neck in Denmark from 1978 to 1988. *J Manipulative Physiol* 1996; 19: 371 - 7

Lebeouf-Yde C, Hennius B, Rudberg E et al. Side effects of chiropractic treatment: a prospective study. *J Manipulative Physiol Ther* 1997 (Oct); 20(8): 511-5

Licciardone J et al. Patient satisfaction and clinical outcomes associated with osteopathic manipulative treatment. *J Am Osteopath Assoc* 2002; 102: 13 - 20

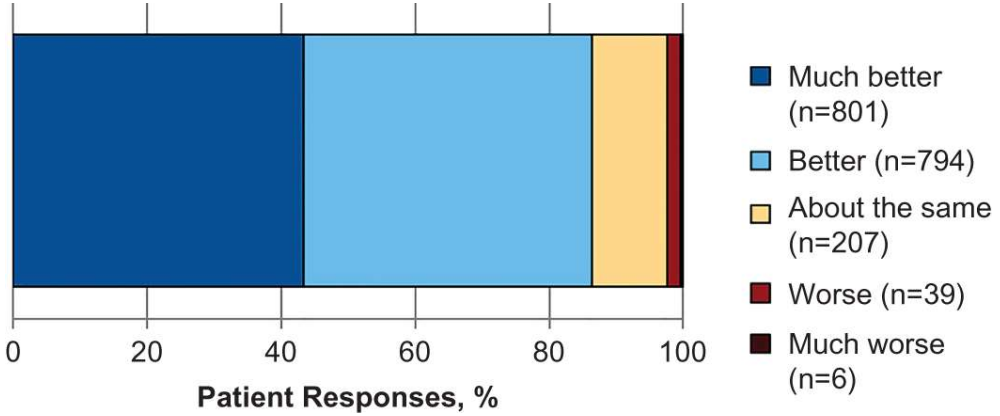
Oliphant D. Safety of spinal manipulation in the treatment of lumbar disc herniations: a systematic review and risk assessment. *J Manipulative Physiol Ther* 2004; 27: 197 - 210

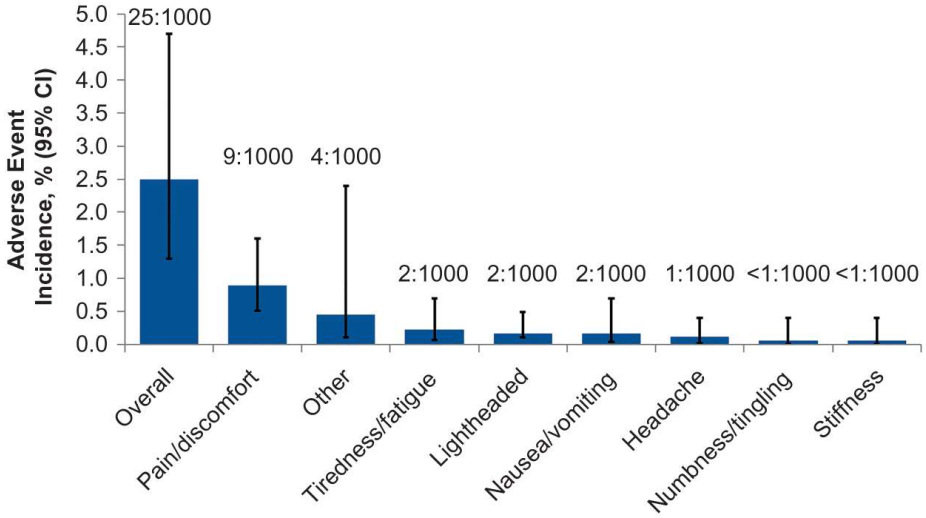
Patijn J. Complications in manual medicine. *J Manual Med* 1991; 6: 89 – 92

Rivett D, Milburn P. A prospective study of cervical spine manipulation. *J Manual & Manipulative Therapy* 1996; 4: 166 - 170

Senstad O, Leboeuf-Yde C, Borchgrevink C. Frequency and characteristics of side effects of spinal manipulative therapy. *Spine* 1997; 22: 435 - 440

Adverse Events Immediately After OMT





Patient-reported responses immediately after osteopathic manipulative treatment
(N=1847 office visits)

Degenhardt BF, Johnson JC, Brooks WJ, Norman L. Characterizing Adverse Events Reported Immediately After Osteopathic Manipulative Treatment. *The Journal of the American Osteopathic Association*. 2018;118(3):141-149. doi:10.7556/jaoa.2018.033

Incidence of Reported Adverse Events Associated with Manual Therapies

- Most adverse events are non-serious mild to moderate

  2.5% to 60.9%

  - Most begin within 24 hours
  - Most resolve within 48 hours

- Mild to moderate local pain and discomfort in the area of treatment.
- Aggravation of presenting complaint:
- Stiffness, headache, muscle spasm, radiating pain, tiredness and fatigue.
- Pain outside the area of treatment
- Lightheadedness, nausea, vomiting

  numbness and tingling.

General Considerations for OMT

- The ability to perform OMT well requires continuous feedback to the physician's hands from the tissues of the patient
- During the OMT, the physician must remain alert to palpatory sensations that indicate where the problem is located and how the tissues are responding to the treatment while it is being performed.
- Let your fingers do the walking, let your fingers do the talking.

General Considerations for OMT

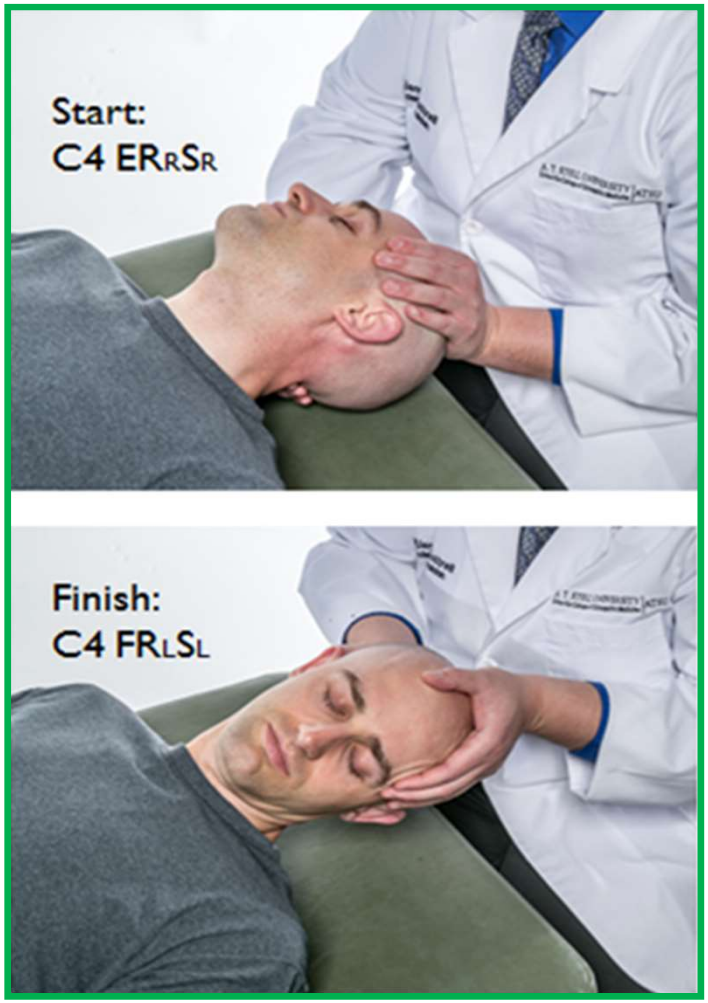
- One technique may treat more than one type of dysfunction.
- More than one type of technique may be required to treat a single type of dysfunction.
- During OMT, many different types of techniques may be employed.

Dosing

- Is more always better?
- The dose of treatment is limited by the patient's ability to respond to treatment.
- The physician may want to do more and go faster; however, the patient's body must have time to make the necessary changes toward health and recovery.

Dosing Guidelines

- "Find it, fix it, and leave it alone."
  - A.T. Still
- Allow the patient, time to respond.
- The ability of patients to respond is variable.



Dosing Guidelines

- The sicker the patient, the less the dose.
- Caring compassionate novices, often err on the side of overdose.
- Allow time for the patient to respond to treatment.
- Do not waste the dose on insignificant areas. Concentrate on key areas needing treatment.
- Chronic disease requires chronic treatment.
- Acute cases should have a shorter interval between treatments; as they respond, the interval is increased.

Dosing Guidelines

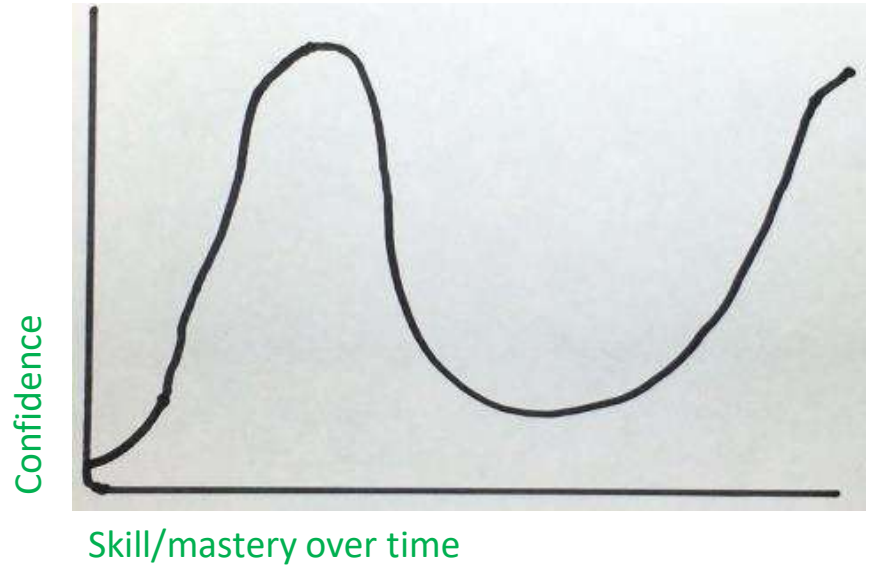
- Pediatric cases can be treated more frequently.
- Children get sick faster, get better faster, most of the time
- Geriatric patients need a longer interval to respond to treatment.

Two Major Factors Determine Technique Choice

- The ability of the physician to execute a technique.
- The ability of the patient to respond to the type of technique.

Physician's Ability

- Physician's knowledge and skill with the various techniques.
- Physician's age, strength and body habitus.
- Availability of a treatment table.
- Hospital, home or office setting.

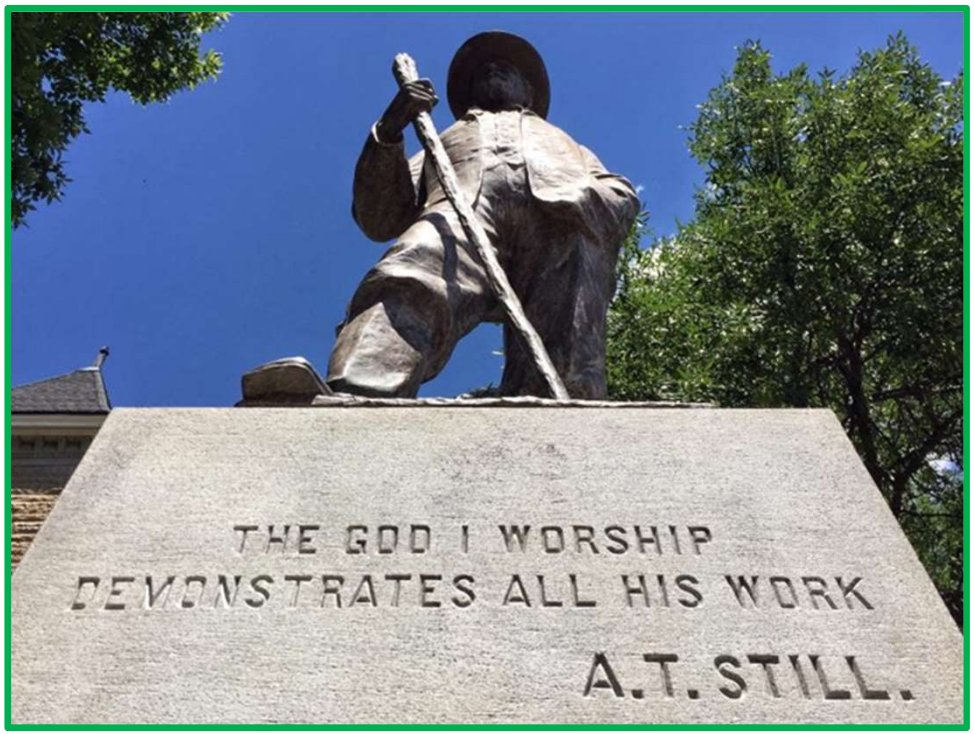


Patient's Ability To Respond

- The patient's physical condition and stamina.
- The Patient's age.
- Acuteness or chronicity of problem / problems.
- Ability of patient to move into certain positions.
- Location of dysfunction or injury.
- Effectiveness of previous techniques used.
- Contraindications to certain techniques in specific patients.

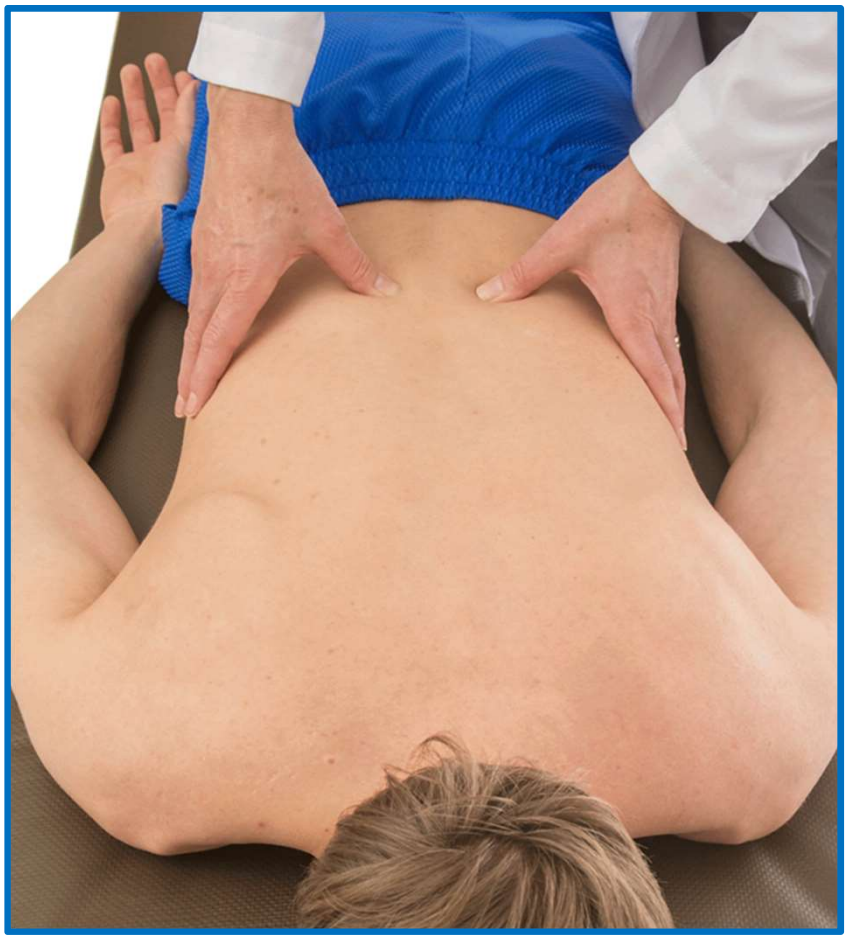
A. T. Still on Technique Selection

- “Every operator should use his own judgment and choose his own method of adjusting all bones of the body.
- It is not a matter of imitation and doing just as some successful operator does, but the bringing of the bone from the abnormal to the normal.”

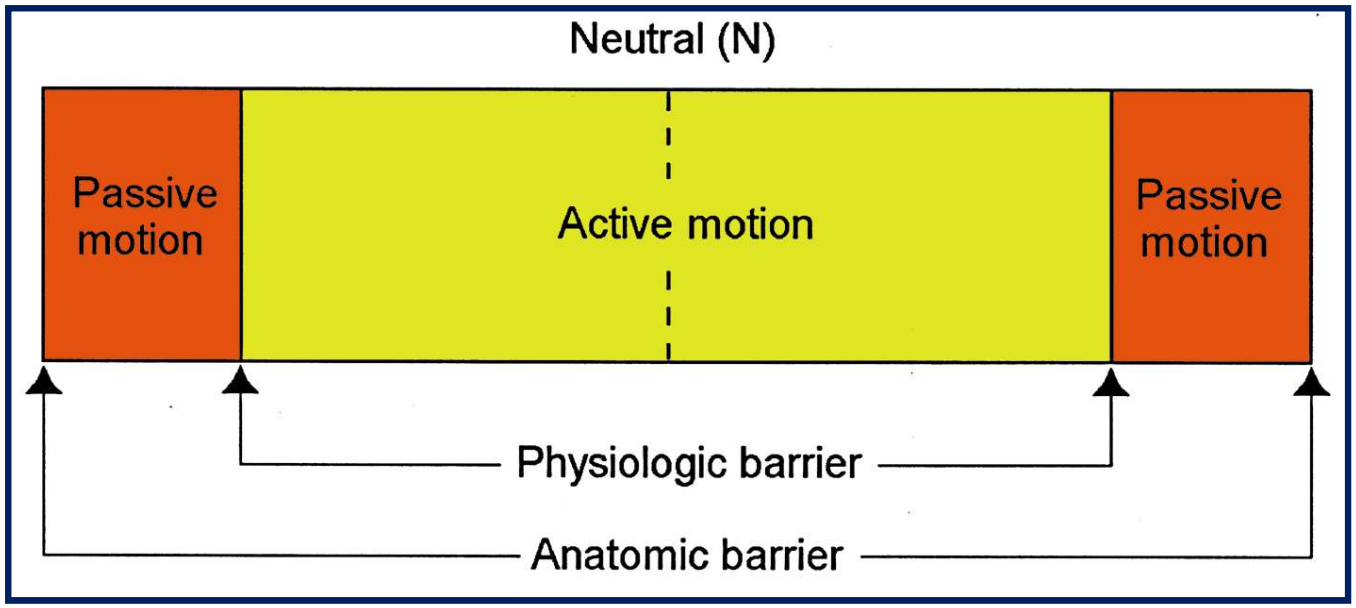


Plan of Intervention

- Decisions made based on answering the following questions:
  - What doesn't move?
  - What direction will it move?
    - Consider all 3 planes of motion!
  - In which direction doesn't it move?
- **GOAL:** Restore lost motion in order to improve physiologic function and/or support homeostasis



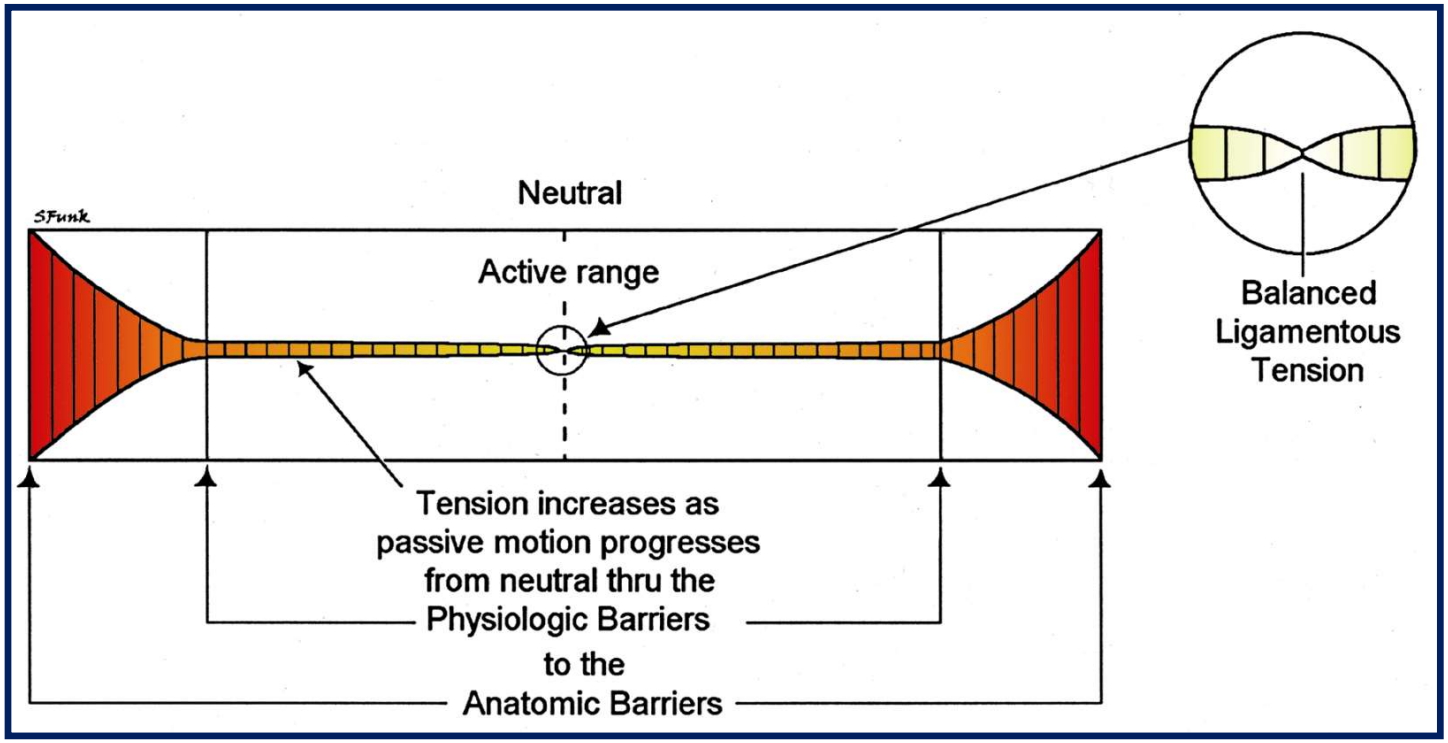
Joint Or Tissue Motion



1. Active motion
2. Physiologic barrier
3. Passive motion
4. Anatomic Barrier

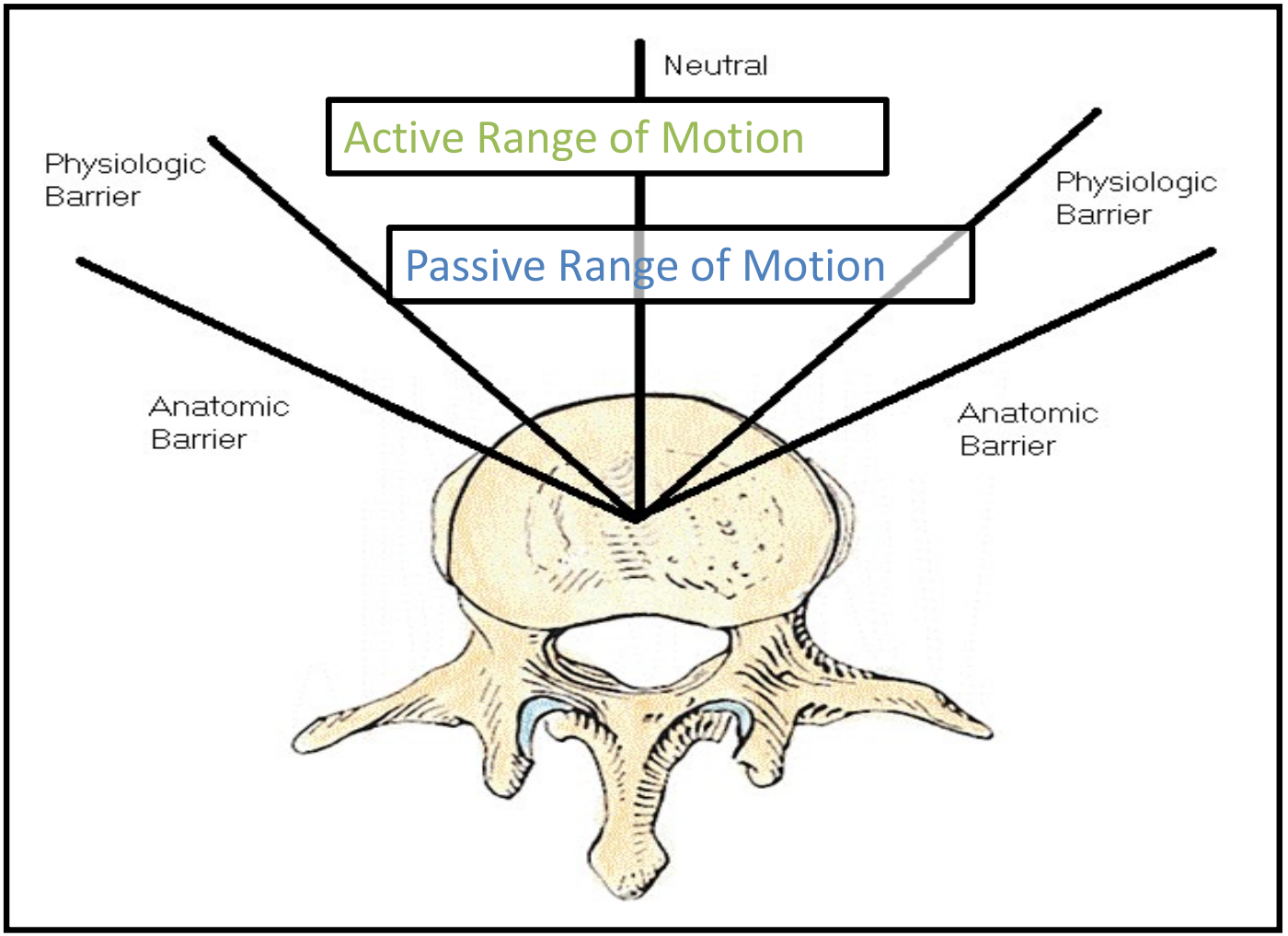
Joint or Tissue Tension

- Neutral position: Balanced ligamentous tension.
- Physiologic barrier: Tension increases to here.
- Anatomic barrier: Maximum tension here.



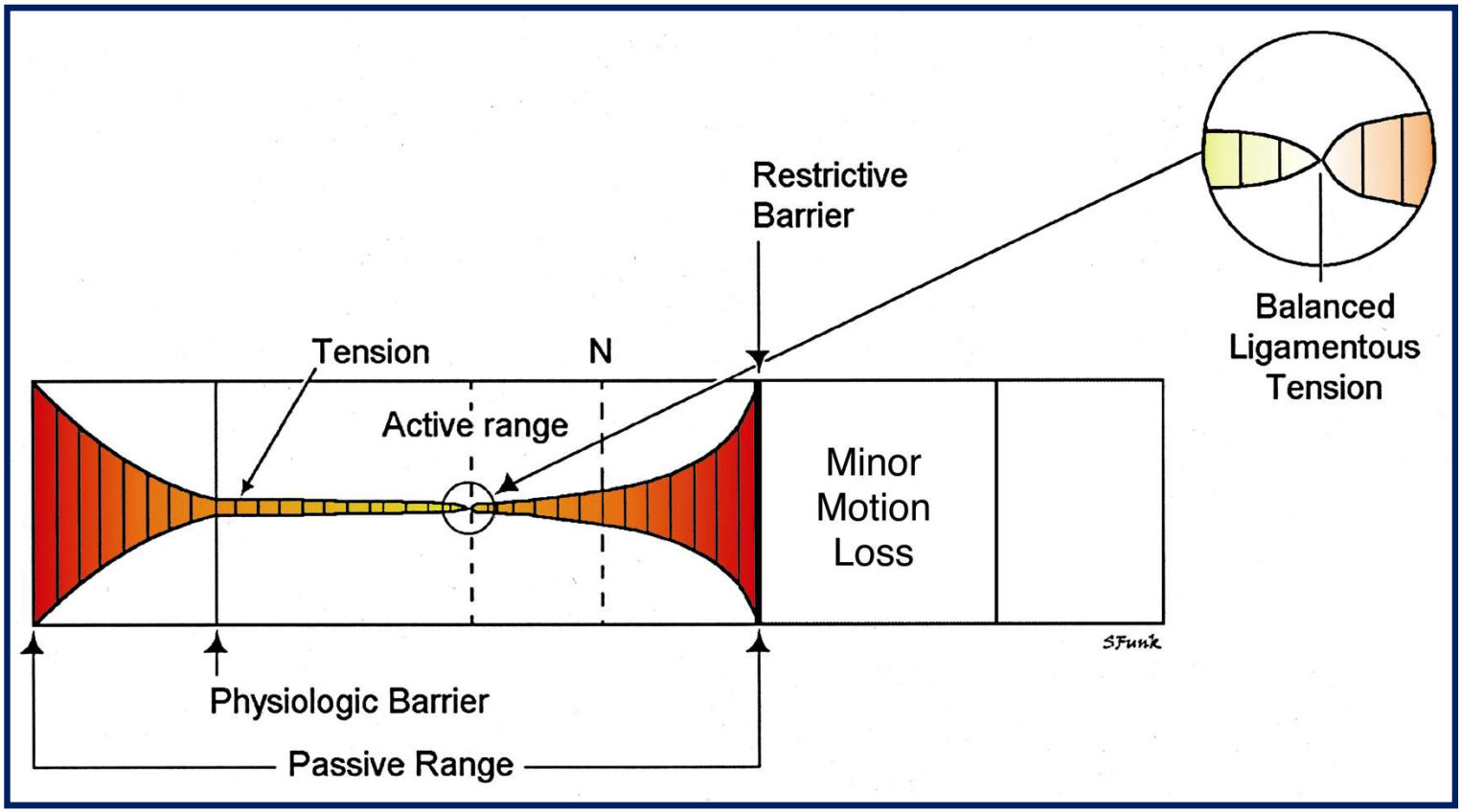
Normal Physiologic Motion

- ***AROM*** *– motion permitted during use of muscles*
- ***PROM*** *– motion permitted with passive movement*



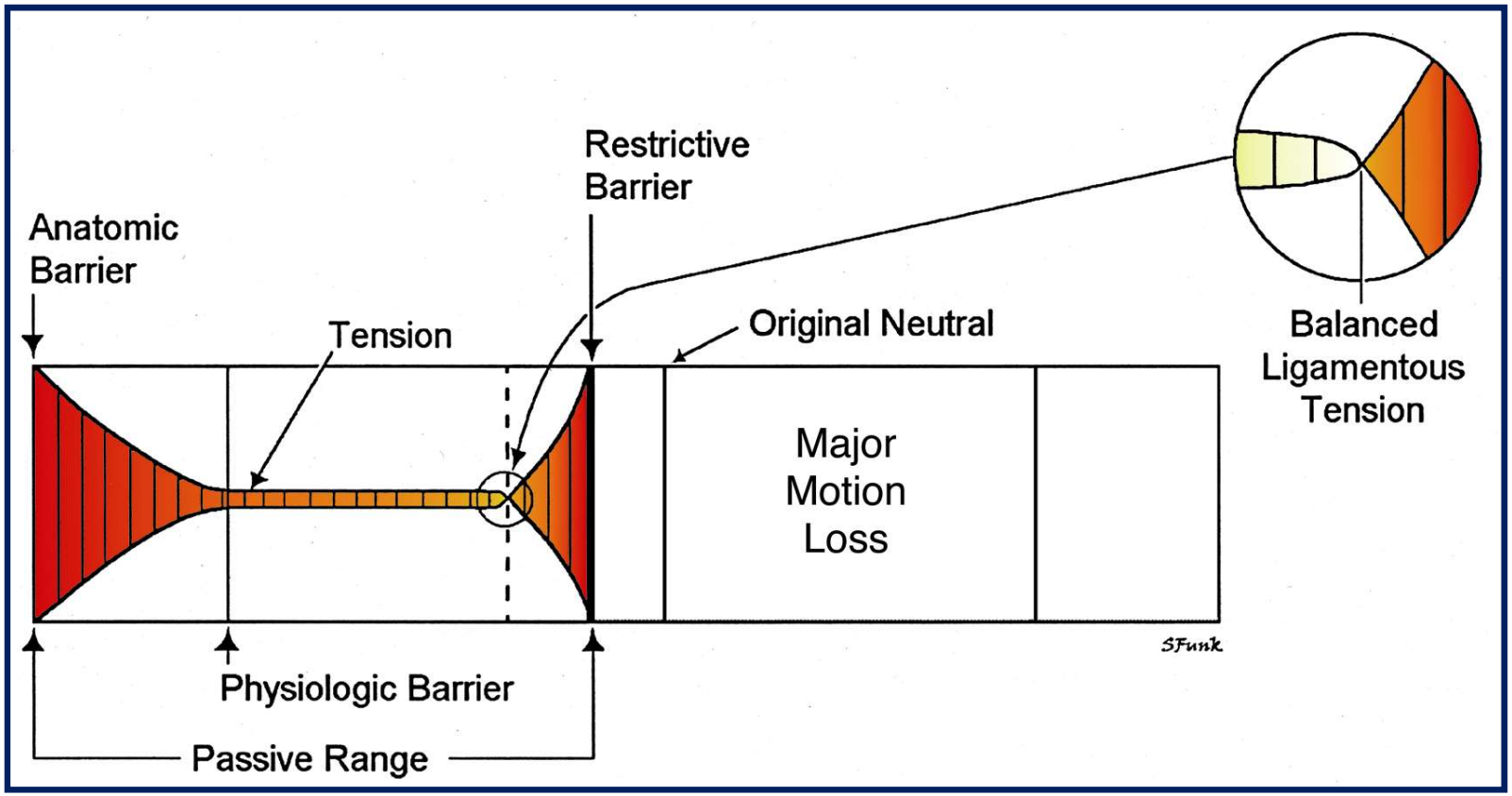
Somatic Dysfunction

- Restrictive Barrier: Minor or major motion loss depending on the severity of the restriction.



Somatic Dysfunction

- Restrictive Barrier: Minor or major motion loss depending on the severity of the restriction.



Two Primary Divisions of Osteopathic Techniques

- Direct Techniques
- Indirect Techniques
- (Combined)
  - A planned sequence
  - Part of the technique is indirect and then a direct component is added (e.g. Still Technique).
  - Part of the technique is direct and then an indirect component is added (less common).
- The two treatment methods determine how the physician initially positions the patient relative to the restrictive barrier.

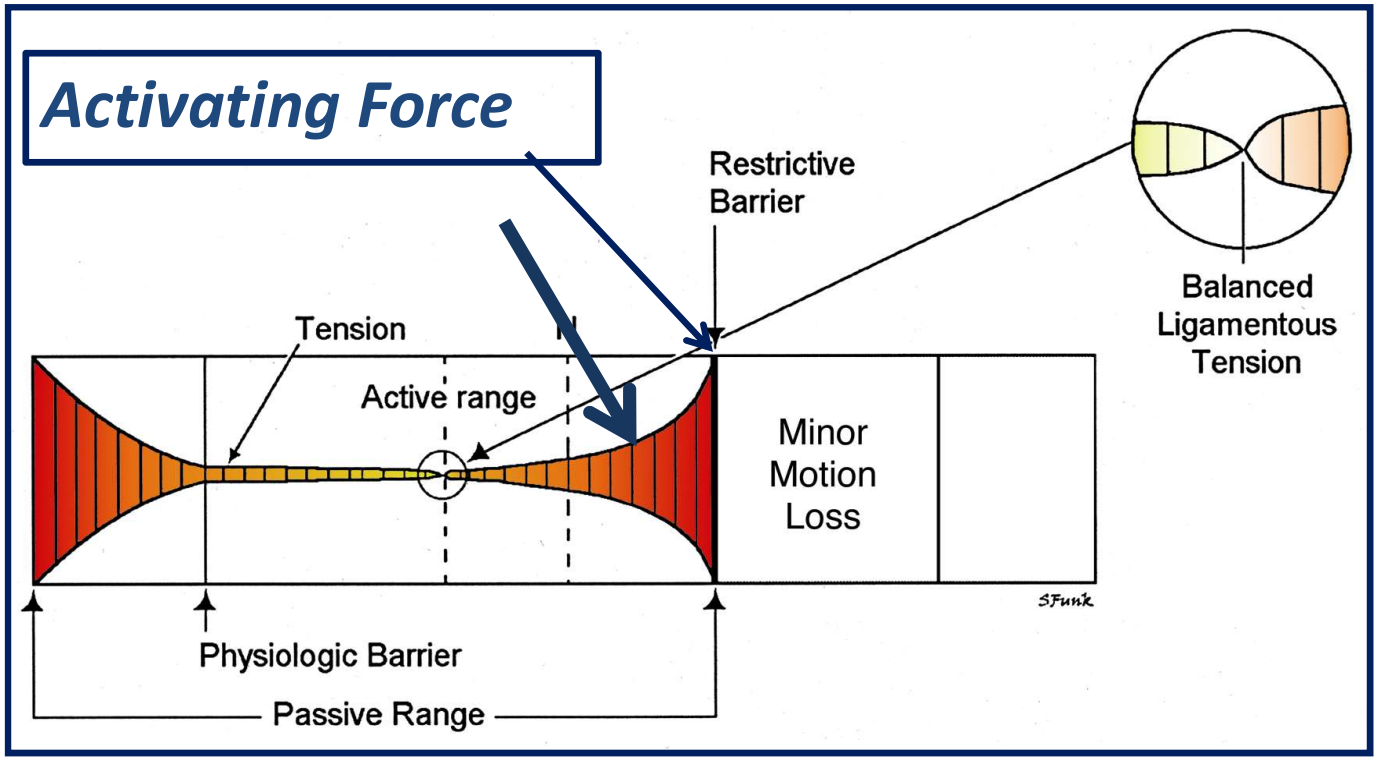
Direct Technique/Method

- An osteopathic treatment strategy by which the restrictive barrier is engaged, and a final activating force is applied to correct somatic dysfunction.

Direct Techniques

- From its resting position, the restricted joint or tissue is taken toward the restrictive barrier.
- Generally, the restricted part is carried to the barrier in one or more planes of motion at the beginning of the technique.
- Activating forces are used to carry the dysfunctional component through the restrictive barrier.
- Usually involves a greater amount of force than indirect techniques.

Direct Techniques



For example:

Soft tissue, Articular, Springing (LVMA), Myofascial Release, Muscle Energy, Thrust techniques (HVLA)

Indirect Technique/Method

- A manipulative technique where the restrictive barrier is disengaged, and the dysfunctional body part is moved away from the restrictive barrier until tissue tension is equal in one or all planes and directions.

Indirect Techniques

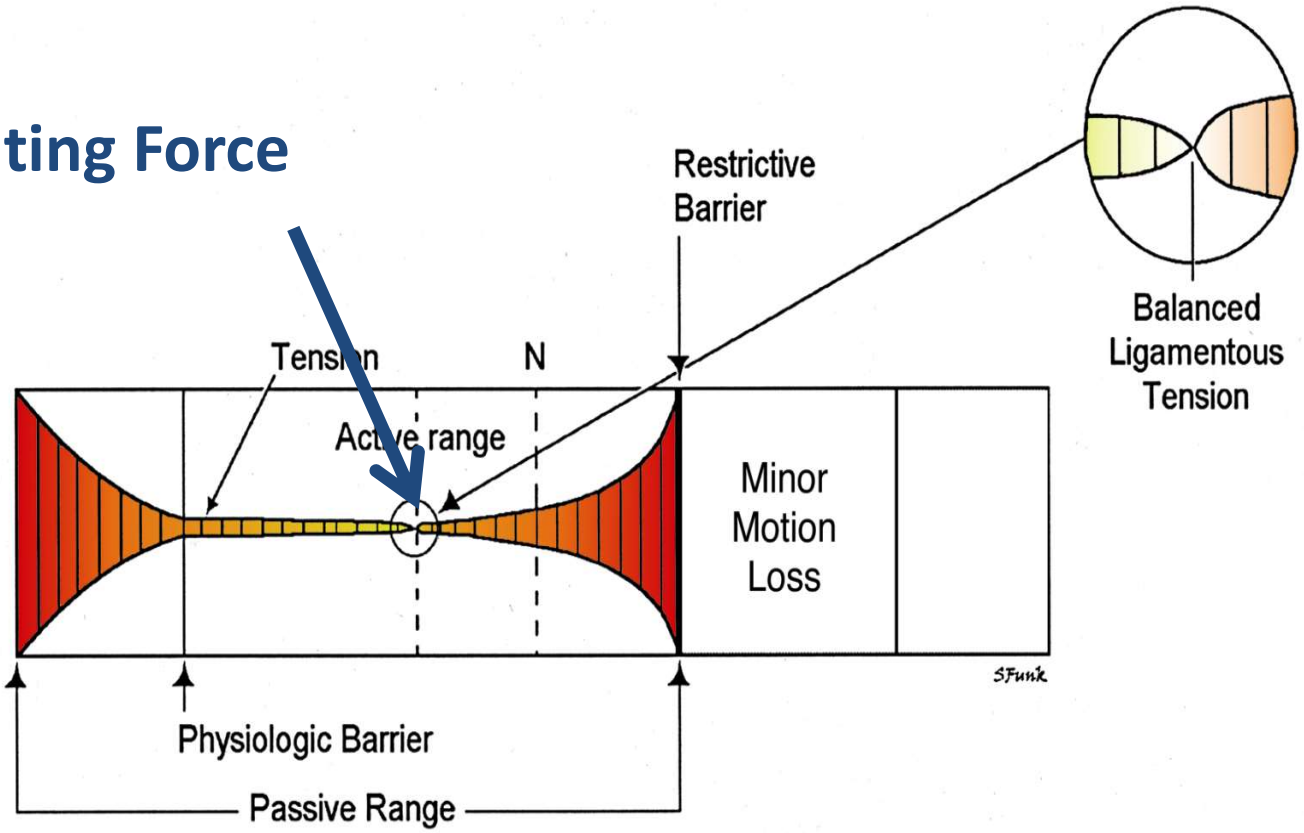
- Move the involved joint or tissues, away from the restrictive barrier.
- Joint or tissues of interest are moved in the direction of ease (decreasing tension).

  -Until tissue tension is equal in one or all planes.
- Joint or tissue is maintained in the position of ease,

  5 seconds to several minutes depending on technique type.
- Release is due to inherent forces rather than physician forces.
- Tensions gradually relax and enhanced mobility occurs.
- Usually comfortable for the patient during the technique.

Indirect Techniques

Activating Force



Indirect Techniques

- May focus on balancing different tissues
- Muscle – Counter strain
- Fascia
- Bone
- Joint capsule and associated ligamentous structures
  - Balanced ligamentous tension technique
  - Functional technique

Ease and Bind

- Direction of Bind: Palpable resistance to motion of an articulation or tissue
  - **Synonym:** Resistance
- Direction of Ease: Relative palpable freedom of motion of an articulation or tissue
  - From the structure's resting position, this will usually be away from the restrictive barrier
  - **Synonyms:** compliance, resilience, balance, breathing, freedom of motion

Diagnostic Criteria for Somatic Dysfunction

T.A.R.T. Criteria

Tissue texture abnormalities

Asymmetry of structure

Restriction of motion

Tenderness

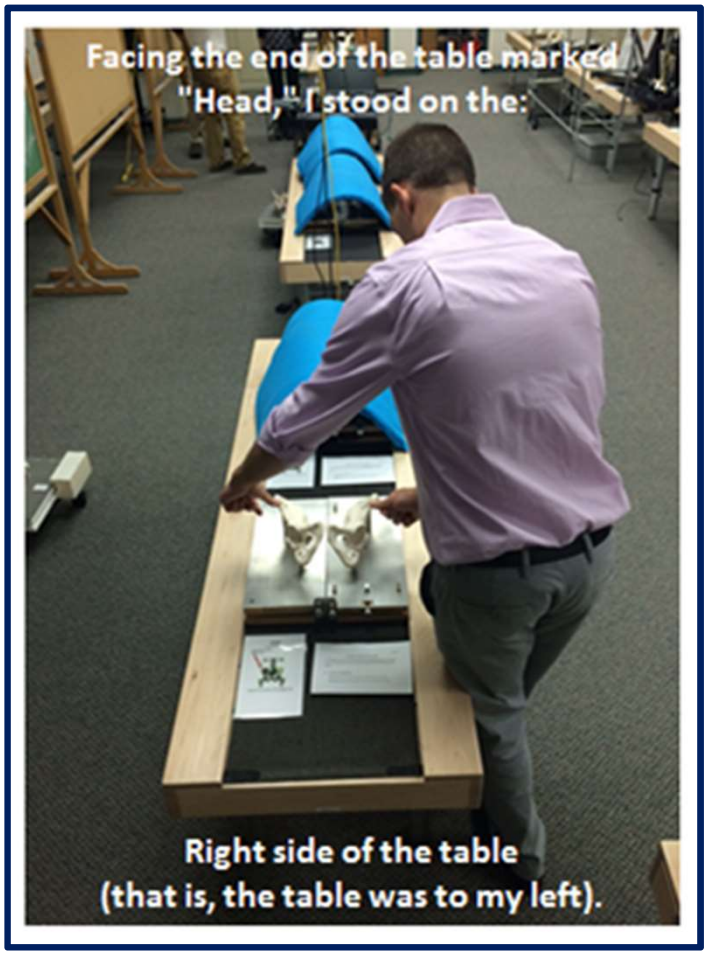
Any one of which must be present for the diagnosis of somatic dysfunction

Dominant Eye

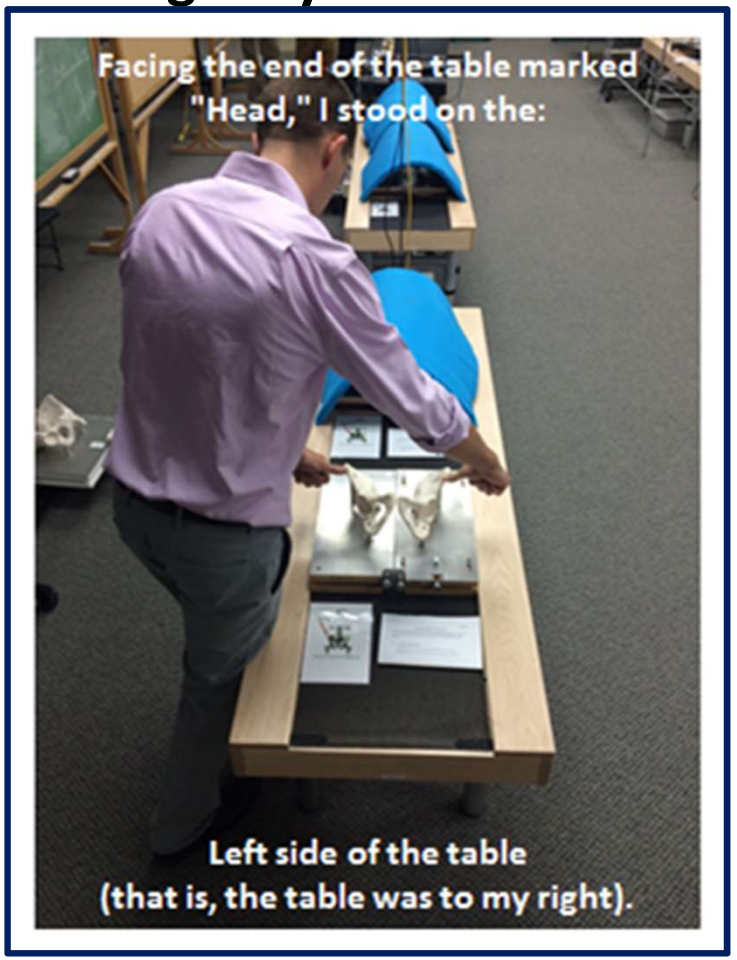
- Clinically, it is useful to know which of your eyes is your dominant eye so that you can place it towards the middle of whatever you are observing and/or palpating.

Dominant Eye towards center of table

Left eye dominant



Right eye dominant



Sighting Dominance
Modified Hole-in-the-Card test

- Hold a card that has a 3-cm hole in the center, with both hands at arm's length
- View a target 6m away through the hole with both eyes open.
- Close one eye then the other to identify the dominant one.
- When the dominant eye is closed, the target will disappear.
- When the non-dominant eye is closed, the target will not disappear.

PLANES & AXES OF MOTION (summary)

- **Coronal Plane:**

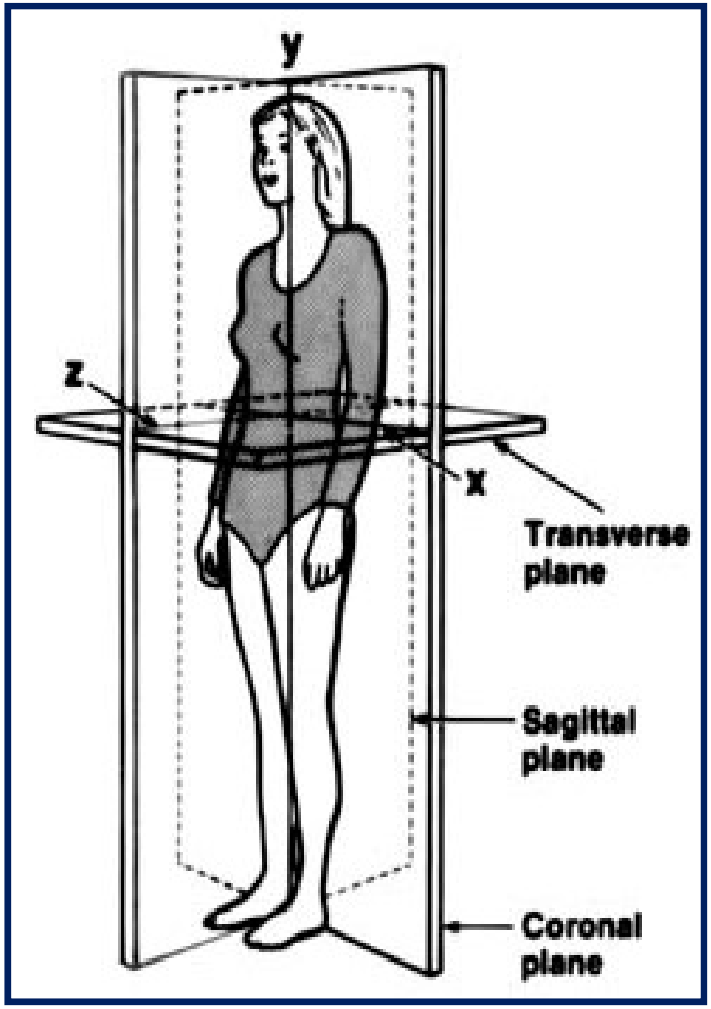
  Side bending around an AP axis.

- **Sagittal Plane:**

  Flexion/extension around a transverse (horizontal) axis.

- **Transverse (horizontal) Plane:**

  Rotation around a Superior/inferior (vertical) axis.



INSPECTION: Gait

DYNAMIC (MOTION)

- Observe and assess a patient's gait:

  For example, a limp, lean, one leg or foot turns out, space of arm from body, etc.

  Any area not moving?

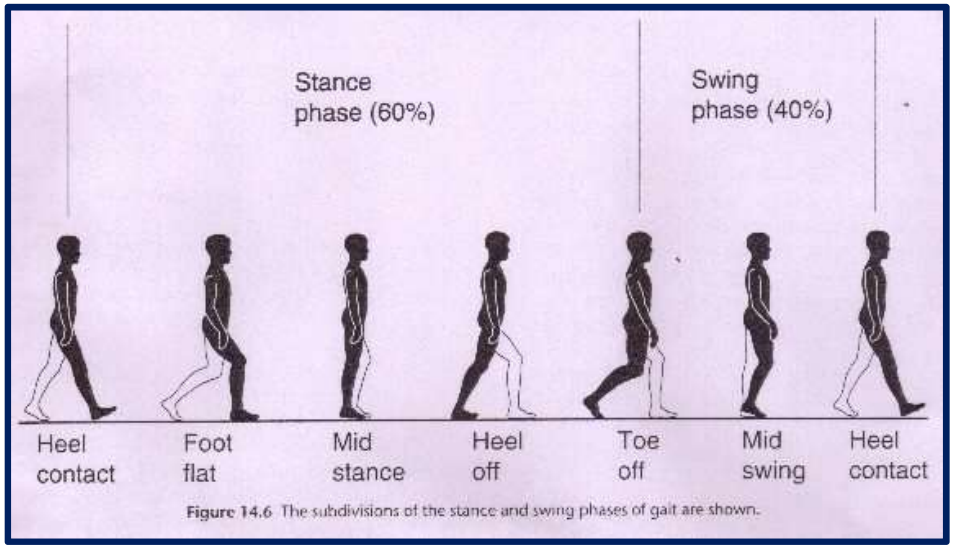


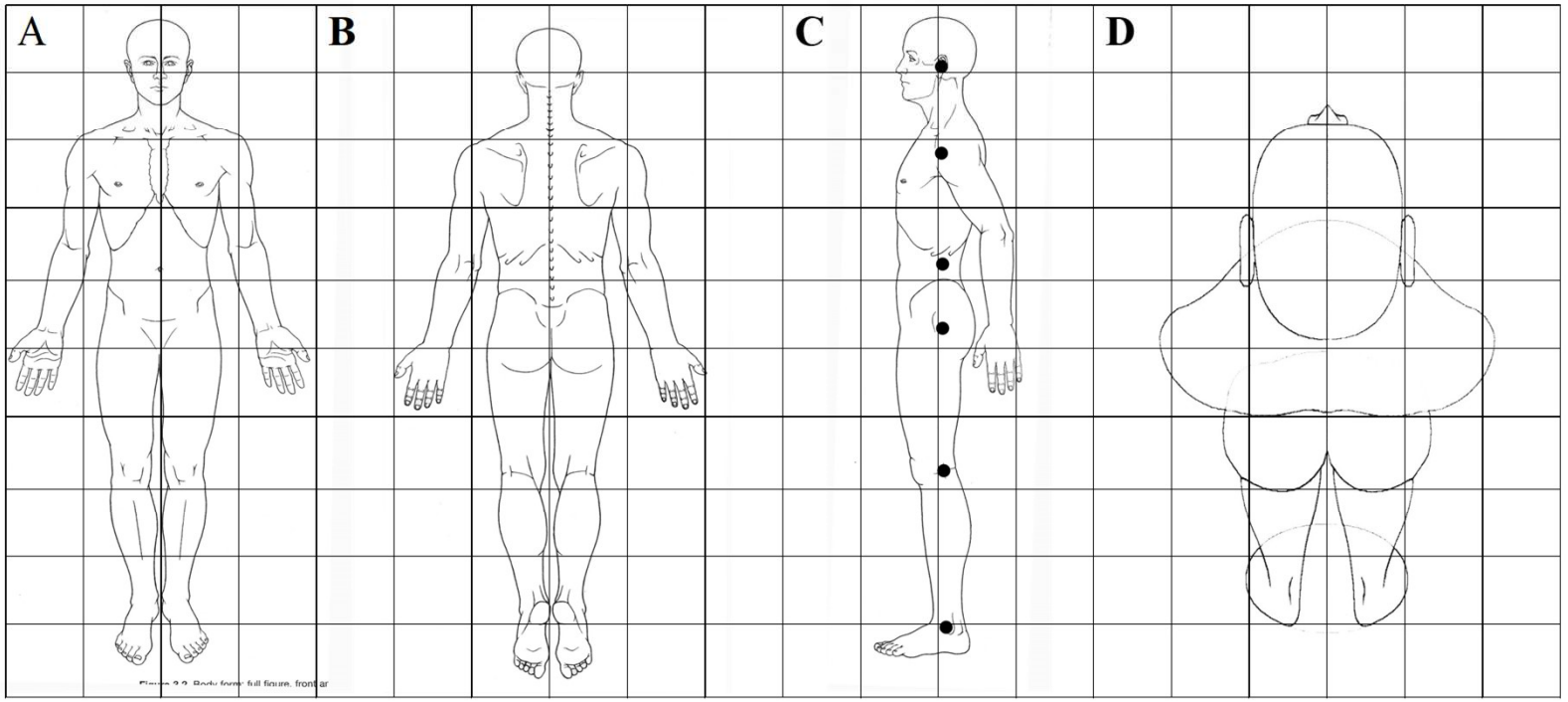
Figure 14.6 The subdivisions of the stance and swing phases of gait are shown.

Department of Osteopathic Manipulative Medicine

Kirksville College of Osteopathic Medicine, Kirksville

Osteopathic Theory and Methods	
OMS1 Palpatory Lab	Date:
Name	

VISUAL and PROPRIOCEPTIVE EVALUATION



AP View - Coronal Plane	PA View - Coronal Plane	Lateral View - Sagittal Plane	Overhead view - Horizontal Plane
Eyes	Mastoid Processes	External Auditory meatus	Head
Earlobes	Shoulders	Mid -Shoulder	Shoulders
Shoulders	Inferior scapular angle	Greater trochanters	Hips
Iliac crests	Iliac crests	Lateral Malleolus	
Knees	Popliteal folds	Body of L3 (X-ray)	

Palpation

- "The art of palpation is one that must be developed. The ability to evaluate the 'feel' of the tissues can be developed only by practice and conscientious application to an extraordinary degree."

Dr. Thomas L. Northrup, Reflex Diagnosis. The Journal of Osteopathy, Dec, 1961, pp. 18-26.

Tissue Texture Abnormality Findings

Acute

- Skin; hot, erythemic, moist (Sudomotor)
- Tissue; swollen, increased turgor
- Muscle; hypertonic, tender, spasm
- Pain; severe, sharp

Chronic

- Skin; cold, pale, dry, increased drag
- Tissue; fibrotic, atrophy, ropey
- Muscle; hypotonicity, flaccid
- Pain; achy and dull

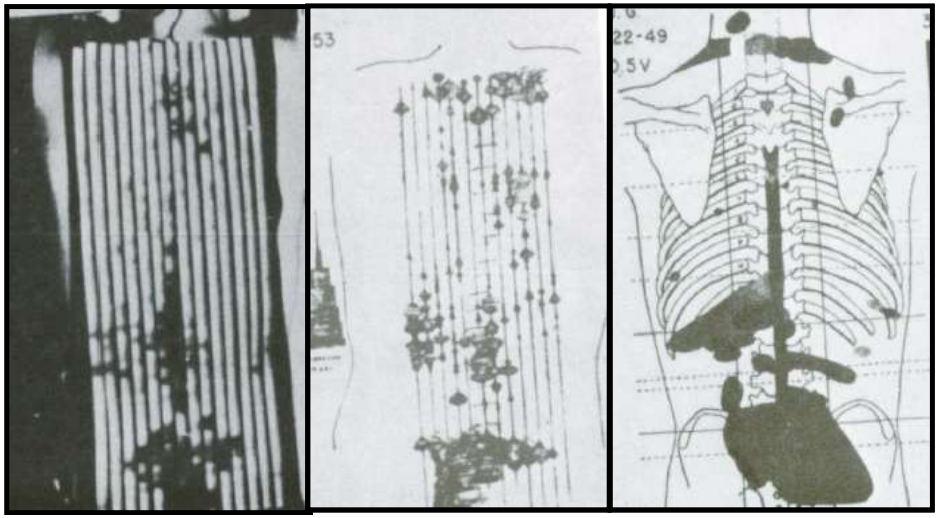
Red Reflex

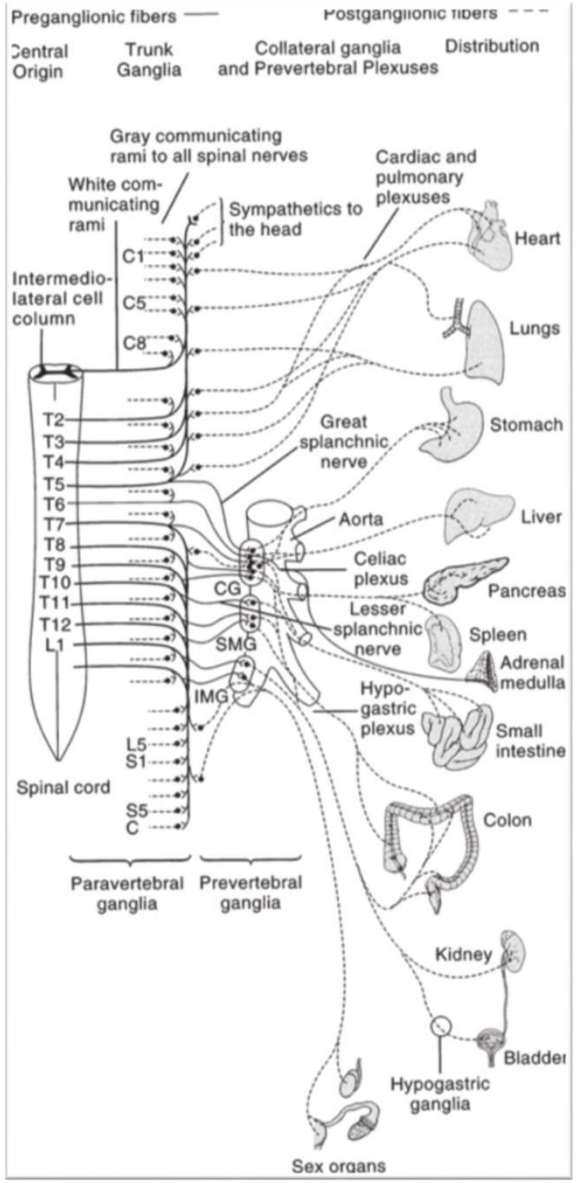
A Red Response

- *Drag fingers along paraspinal muscles.*
- *Watch for red response.*
- *Note areas that remain red long after other areas resolve.*

Red Reflex

- *Reactive hyperemia,* is greater in degree and duration in an area of acute somatic dysfunction as compared to an area of chronic somatic dysfunction.
  - Reflection of the segmentally related sympathicotonia commonly observed in the paraspinal area



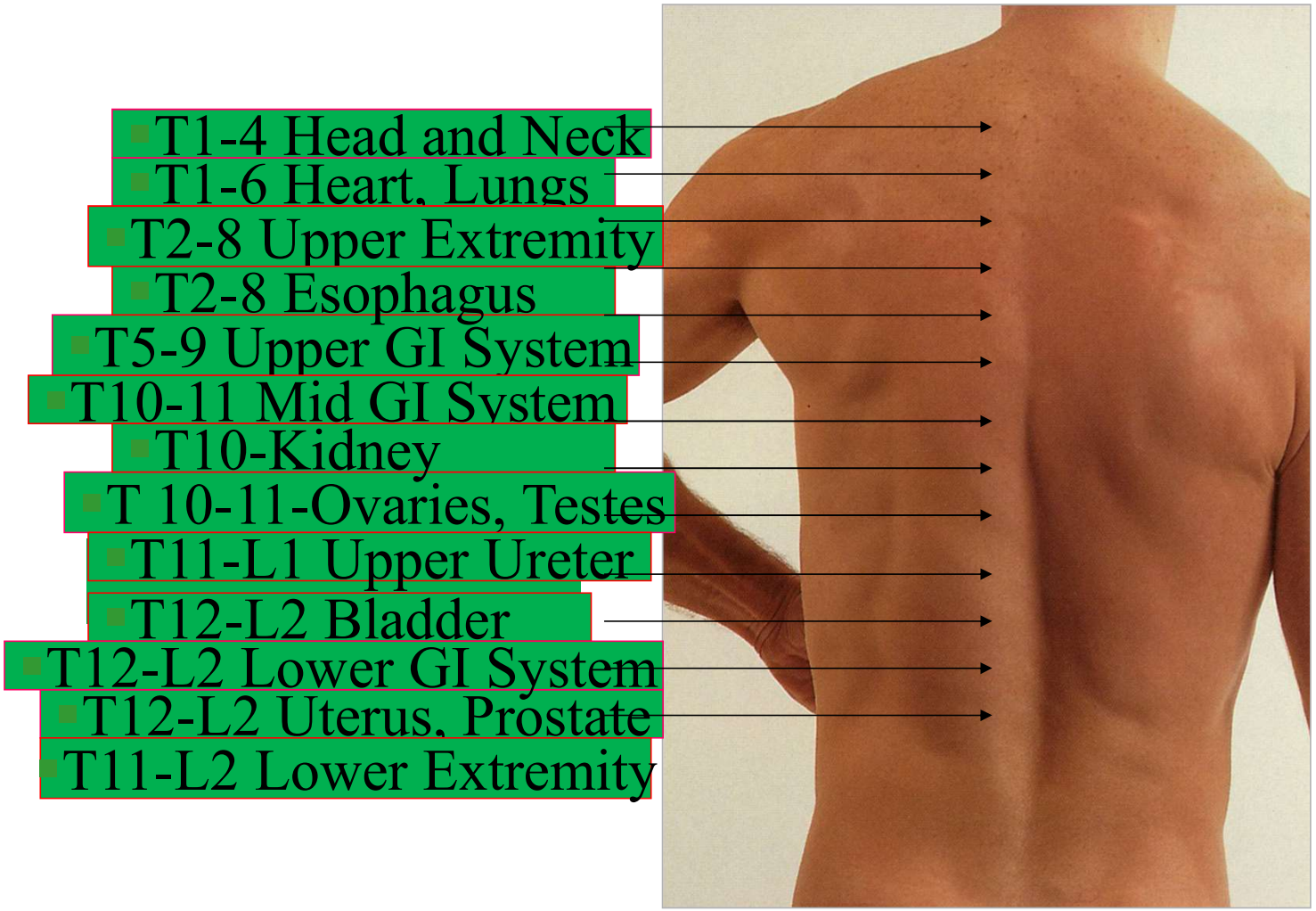


Sympathetic Nervous System

- Primary purpose is to stimulate the body's fight-or-flight response.
- Preferentially will shunt blood from the viscera to the musculoskeletal system, heart and brain
- Sympathetic chain (paravertebral) ganglia (T1 - L2,3) and prevertebral ganglia (celiac, superior and inferior mesenteric)
- Primarily innervates viscera and the entire body’s vasculature

Sympathetic division of peripheral autonomic system. CG, celiac ganglion; SMG, superior mesenteric ganglion; IMG, inferior mesenteric ganglion. (From Chusid JG. Correlative Neuroanatomy and Functional Neurology, Los Altos, CA: Lange Medical Publishers, 1985, with permission.)

Somatotopic Relationships to Sympathetic Function



Lab Exercise #2

- Appreciate the texture of your partners back, identify areas of the paraspinal regions that are:
  - Warm vs. Cool (dorsum of hand)
  - Moist vs. Dry (light, surface skin drag)
  - Boggy vs. Firm (region between dermis and musculature
  - Ropey vs. Hypotonic vs. Hypertonic (deeper palpation into musculature)
  - Red Reflex – present vs absent (deeper skin drag)
- When possible, simultaneously compare left vs right using the pads of digits 2-4

Motion Restriction: Barrier “end feel” characteristics

- Bony: Hard
- Tendinous: Elastic
- Ligamentous: Firm and abrupt
- Soft tissue: Soft
- Guarding: Empty
  - Patient voluntarily limits the motion secondary to pain

Lab Exercise #3: expected barrier end feel

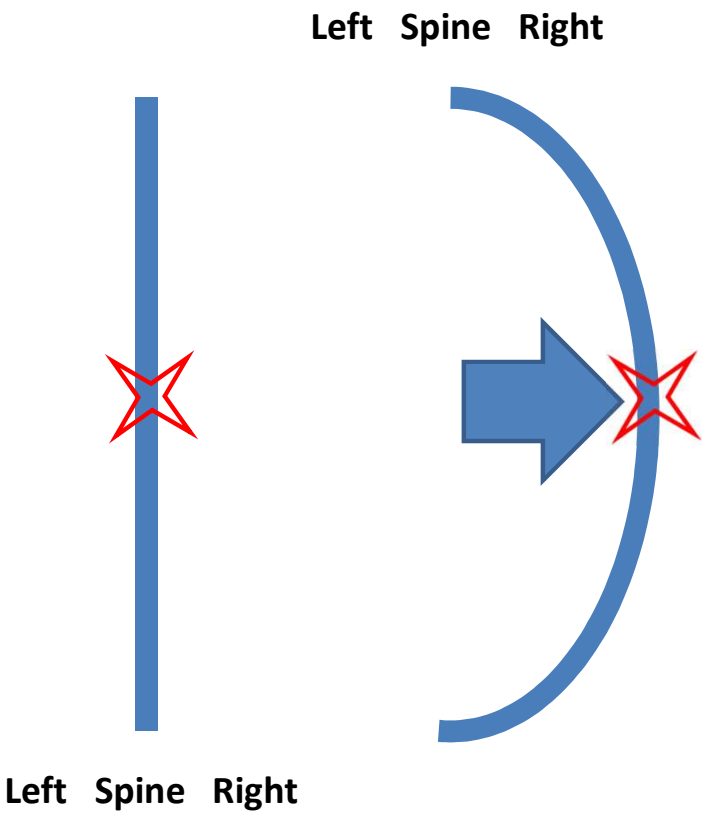
- Soft Tissue Barrier
  - Elbow flexion
  - Knee flexion
  - Hip flexion (?)
- Boney Barrier
  - Elbow extension
- Guarding/Empty Barrier
  - Be creative
- Tendinous Barrier
  - Wrist flexion/extension
  - Ankle dorsiflexion/plantar flexion
  - Elbow flexion coupled with shoulder flexion
- Ligamentous Barrier
  - Ankle plantar flexion
  - Knee extension
  - Drawer testing of knee and ankle

Side bending and Translation

- Translation is motion of a body part along an axis.
- Left translation and right translation in the context of positioning a patient's spine refer to movement along an axis that is transverse to the spine
  - Left translation will induce right side bending of the spine at the level where the translation is introduced
  - Right translation will induce left side bending of the spine at the level where the translation is introduced

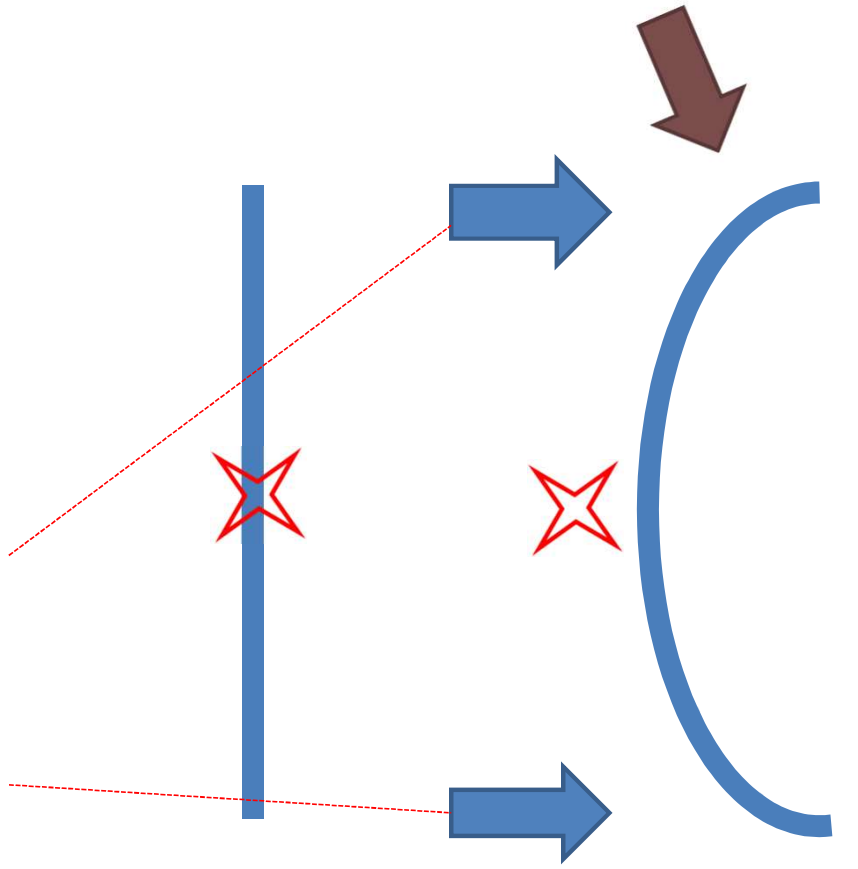
Side bending and Translation

- **At the level of the somatic dysfunction:**
  - Right translation = left sidebending
  - Concave left = left sidebending
  - Convex right = left sidebending



Side bending and Translation

- Markedly above or below the level of the somatic dysfunction (✡):
  - Right translation may create right sidebending
    - E.g. pulling shoulder to the right
    - E.g. pulling pelvis to the right



Extension and Anterior Translation

- Translation is motion of a body part along an axis.
- Anterior translation in the context of positioning a patient's spine refer to movement along a posterior to anterior axis.
- Anterior translation of a **spinous** process will induce extension of the spine at the level where the translation is introduced.
- Anterior translation of a transverse process will primarily induce rotation to the opposite side.

References

Atlas of Common Counterstrain Tender Points by Karen T Snider & John C Glover
https://itunes.apple.com/us/book/atlas-common-counterstrain/id656292117?mt=13

Beal, MC. Viscerosomatic reflexes: a review. JAOA. 1985; 85:786-801.

Chila, A.G. (ed.): Foundations for Osteopathic Medicine 3rd Edition, Lippincott Williams & Wilkins, Baltimore, MD, 2011.

Hoag, JM. The musculoskeletal system: a major factor in maintaining homeostasis. 1977 AAO yearbook.

Kimberly, P.; *Outline of Osteopathic Manipulative Procedures: Kimberly Manual, 2006 Edition* (updated 2008). Chapter 3.

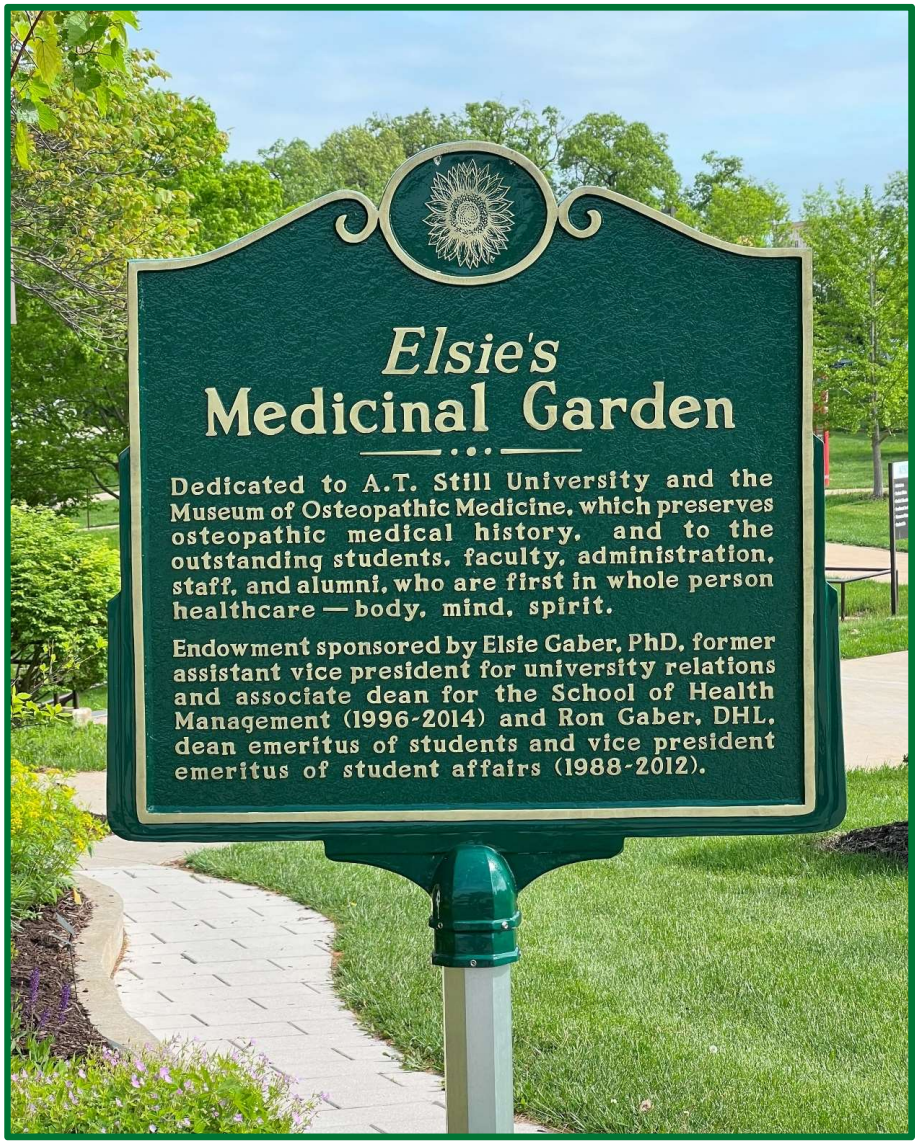
Kimberly, P.; Outline of Osteopathic Manipulative Procedures: Kimberly Manual, 2006 Edition (updated 2008) – Digital Edition 1.0, iBook
https://itunes.apple.com/us/book/kimberly-manual/id572992328?mt=11

Rogers F, D'Alonzo G, Glover J, Korr I, Osborn G, Patterson M, Seffinger M, Taylor T, Willard F. Proposed tenets of osteopathic medicine and principles for patient care. J Am Osteopath Assoc 2002;102(2):63–65.

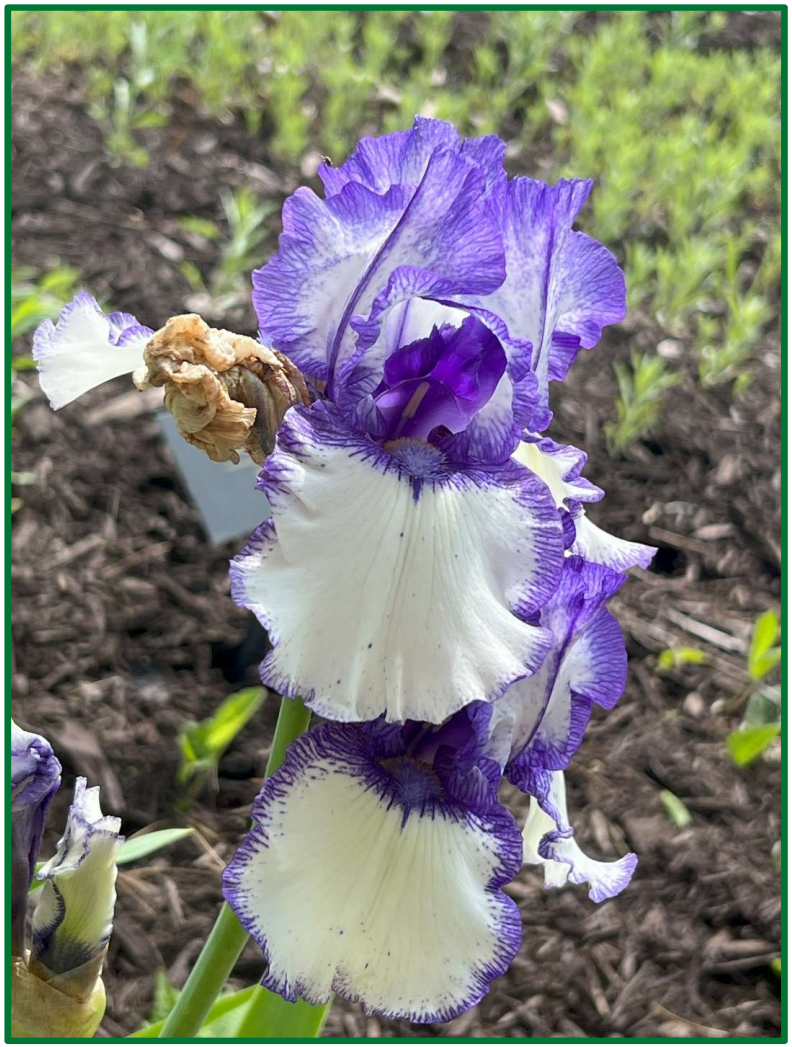
Seffinger, M.A, A.G. (ed.): Foundations for Osteopathic Medicine 4th Edition, Wolters Kluwer, Philadelphia, PA, 2018. http://meded.lwwhealthlibrary.com.p.atsu.edu/book.aspx? Foundations of Osteopathic Medicine, 4e

Ward, R.C. (ed.): *Foundations for Osteopathic Medicine 2nd Edition*, Williams & Wilkins, Baltimore, MD, 2003. Chapters 40 &72.

Zink JG, Lawson WB. An osteopathic structural examination and functional interpretation of the soma. Osteopath Ann. 1979;7:12.


Elsie's
Medicinal Garden
Dedicated to A.T. Still University and the Museum of Osteopathic Medicine, which preserves osteopathic medical history, and to the outstanding students, faculty, administration, staff, and alumni, who are first in whole person healthcare — body, mind, spirit.
Endowment sponsored by Elsie Gaber, PhD, former assistant vice president for university relations and associate dean for the School of Health Management (1996-2014) and Ron Gaber, DHL, dean emeritus of students and vice president emeritus of student affairs (1988-2012).

That is all.



Supplemental Material

- These slides provide some further information on integration into patient care and a little information on research supporting the use of OMT
- The overall goal of this course was to focus primarily on manual skill and technique development so this supplemental material was not presented during course time

"Osteopathic manipulative treatment (OMT) has always been and continues to be used by osteopathic physicians (DOs) as an adjunct to a comprehensive medical and surgical practice to correct inefficient biomechanics of the musculoskeletal system (somatic dysfunction), improve homeostatic mechanisms, including natural immune system functions, and aid the patient in the restoration of health."

Michael A. Seffinger, D.O., F.A.A.F.P.

Integrating the Osteopathic Thought Process into Patient Care

Subjective: Patient history informed by your understanding of the 4 Tenets

Objective: Physical evaluation including TART findings.

Assessment: Diagnoses including regions of somatic dysfunction

Plan: Medications, Surgery, Lifestyle Changes, Surveillance, etc. and OMT as indicated

Does OMT Work?

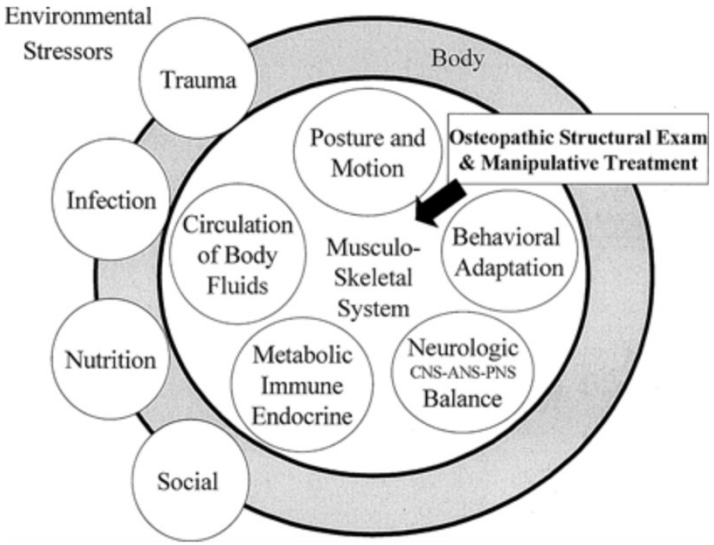
- Many different approaches to OMT.
- Many different techniques.
- Many different practitioners performing the ‘same’ technique differently.
- Many different patient populations.
- Many different diseases conditions.

Where and Why to use OMT on an Individual Patient

- Patient Care is Complex.
- General medical and surgical management of conditions change over time.
- Patients burden of somatic dysfunction varies.
- 5 models approach for guidance on how to incorporate OMT into overall patient care of an individual patient.

From: **Osteopathic Philosophy**

Foundations of Osteopathic Medicine, 3e, 2010



Legend:

Osteopathic philosophy of health displayed as the coordinated activity of five basic body functions, integrated by the musculoskeletal system, adapting to environmental stressors. Evaluation and treatment of the musculoskeletal system is performed in light of its ability to affect not only the five functions but also ultimately the person's own ability to adapt to internal and external stressors.

Osteopathic Approaches to Patient Care

Model	Anatomical Correlates	Physiological Functions
Biomechanical	Postural muscles, spine, and extremities	Posture and motion
Respiratory-Circulatory	Thoracic inlet, thoracic and pelvic diaphragms, tentorium cerebelli, costal cage	Respiration, circulation, venous, and lymphatic drainage
Metabolic-Energy	Internal organs, endocrine glands	Metabolic processes, homeostasis, energy balance, regulatory processes; immunological activities and inflammation and repair; digestion, absorption of nutrients, removal of waste; reproduction
Neurological	Head (organs of special senses), brain, spinal cord, autonomic nervous system, peripheral nerves	Control, coordination, and integration of body functions; protective mechanisms; sensation
Behavioral	Brain	Psychological and social activities, e.g., anxiety, stress, work, family; habits, e.g., sleep, drug abuse, sexual activities, exercise; values, attitudes, beliefs

Areas of Research that Provide Support for Using OMT in Clinical Practice

- Basic Science
  - Cellular
  - Animal
- Human subjects
  - Mechanistic
  - Palpatory diagnosis
    - Examiner reliability
    - Correlation with clinical conditions
  - Clinical outcomes
    - POEM vs DOE?
- Manual medicine
  - Chiropractic
  - Physical Therapy
  - Physiatry
  - DOs
    - U.S. & Elsewhere
  - Others

Patient Perspective

- What do patients care about?
  - Patients don't care about whether a medication will lower their blood pressure but rather they want to know "will it help to increase the length of my life or improve the quality of my life?"
- Does the evidence affect:
  - Mortality
  - Morbidity
  - Quality of life

POEM

Patient-**O**riented **E**vidence

that **M**atters

Matters to the clinician, because if valid, it will *require* a *change* in practice.

Matters to the patient because it affects morbidity, mortality, quality of life.

Shaughnessy AF, Slawson DC, Bennett JH. Becoming an Information Master: A Guidebook to the Medical Information Jungle. The Journal of Family Practice 1994;39(5):489-99.

Relevance: Type of Evidence

- **POEM**: Patient-oriented evidence that matters
  - mortality, morbidity, quality of life
  - Longer, better or both
- **DOE**: Disease-oriented evidence
  - pathophysiology, pharmacology, etiology

Chronic Migraine (Cerritelli, et.al. 2015)

- 225 assessed at neurology clinic
  - Neurologist and staff blinded to allocation
  - Patients blinded to sham vs OMT.
- 3-armed randomized controlled trial (n=105)
  - OMT + medication therapy (n=35)
  - Sham + medication therapy (n=35)
  - Medication therapy only (n=35)
- Days of migraine per month
- Pain Severity, Medications
- Functional Disability, HIT-6

Chronic Migraine (Cerritelli, et.al. 2015)

- OMT
  - 6 Italian osteopaths
  - Need-based patient tx approach based on eval.
  - BLT, BMT, MFR, Cranial-sacrum
  - 8 txs over 24 weeks
- Sham
  - Similar eval.
  - Light touch while silently subtracting by seven
  - 8 txs over 24 weeks

Chronic Migraine (Cerritelli, et.al. 2015)

Days of Migraine per Month			
	OMT	Sham	Control
baseline	22.5	22.3	22.5
6 months	1.2	18.6	22.3
Patients Taking Medications			
baseline	35	35	35
6 months	7	32	35

OMT significantly ($p<0.001$) reduced Days of Migraine/month and number of patients taking medications compared to Sham or Control.

HIT-6, Severity of Pain, and Functional Disability all improved significantly ($p<0.001$ in the OMT group.

Complementary and alternative medicine supported neuromusculoskeletal techniques for treatment of chronic pelvic pain syndrome

Treatment category	Participants (n)	Pain inclusion criteria	Sex (male, female, both)	Primary outcome measures
Manipulation	80	Abdominal	Both	VAS pain, symptom improvement scales
	60	Abdominal	Both	VAS pain, symptom improvement scales
	35	CPPS	Males	IPSS, NIH-CPSI, quality of life
	19	CPPS	Males	IPSS, NIH-CPSI, quality of life
	19	CPPS	Females	PDI, VAS pain, RAND-36 Health Survey
	6	Pelvic	Females	Pain Likert scales, symptom improvement Likert scales
Myofascial release	374	CPPS	Both	Symptom improvement scales, medication usage
	42	Pelvic	Both	Symptom improvement scales
	39	CPPS	Females	Pain scales, urgency, severity and impact of life questionnaire, levator ani morphology, pain thresholds
	31	CPPS	Males	NIH-CPSI
	14	CPPS	Males	NIH-CPSI, GUPI
Acupoint stimulation	100	CPPS	Males	NIH-CPSI
	68	CPPS	Males	NIH-CPSI
	55	CPPS	Females	VAS Pain
	15	CPPS	Females	Serum CRP, McGill Pain Questionnaire, VAS pain, pelvic pain questionnaire, symptom improvement scales
BFA	60	Abdominal	Both	PFSD scale, symptom improvement scales
	15	CPPS	Female	Psychophysical metrics, evoked pain outcomes
Biofeedback	94	Pelvic	Females	Symptom improvement scales, satisfaction questionnaire
	33	CPPS	Females	Reported pain, symptom improvement
	21	CPPS	Males	VAS pain, symptom improvement scales
Photobiomodulation	30	CPPS	Males	VAS pain, NIH-CPSI

CPPS: chronic pelvic pain syndrome; CRP: C-reactive protein; GUPI: genitourinary pain index; IPSS: International Prostate Symptom Score; NIH-CPSI: National Institutes of Health-Chronic Prostatitis Symptom Index; PDI: Pain Disability Index; PFSD: Pain Frequency-Severity-Duration; RAND-36: RAND corporation 36-Item Short Form Health Survey; VAS: visual analog scale

- Marks SK, Rodriguez NA, Shah A, Garcia AN, Ritter L, Pierce AN. Clinical Review of Neuromusculoskeletal Complementary and Alternative Approaches for the Treatment of Chronic Pelvic Pain Syndrome. Cureus. 2022 Jul 20;14(7):e27077. doi: 10.7759/cureus.27077. PMID: 35989846; PMCID: PMC9388957.

Depression (Plotkin, et.al. 2001)

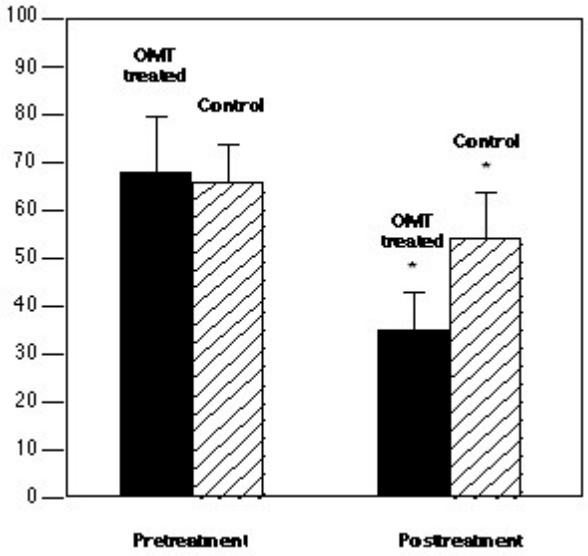
- Randomized, controlled clinical trial
- Women with depression, age 20-50
- 2 groups
  - Standard care + OMT (n=8)
  - Standard care + placebo control (n=9)
- All received Paxil plus weekly psychotherapy for 8 weeks
- Psychiatrists and psychotherapists blinded to group assignment

Depression

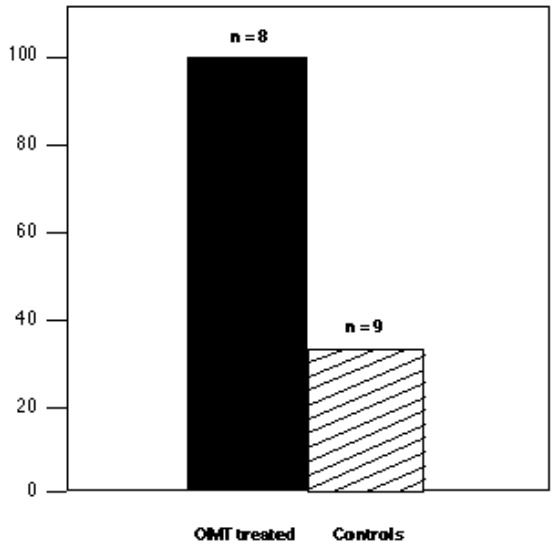
- Placebo Control
  - 30 minute osteopathic structural exam
  - 142 examination points head to toe

- OMT
  - Students under physician supervision
  - Structural exam + 20 minute treatment based on findings
  - Direct, indirect and cranial techniques

Depression Results:



Zung Depression Scale
OMT Post-treatment decreased versus control (P<.001)



Percent of Patients returning to normal (score < 50 = normal)

Recurrent Acute Otitis Media (Mills et al 2003)

- Children 6 months – 6 yrs. of age with recurrent acute otitis media (AOM) (n= 57)
- randomized to one of two groups:
  - standard care plus OMT (n=25)
  - standard care only (n=32)
- Pediatrician blinded to patient group and study outcomes
- Osteopathic physician blinded to patient clinical course

Recurrent Acute Otitis Media

- OMT provided by osteopathic physicians specializing in NMM/OMM
- OMT 15-25 minutes
- Entire body, attention to head and neck
- No HVLA, gentle techniques on restricted areas
- Balance ligamentous tension, balanced membranous tension, myofascial release, facilitated positional release, counterstrain

Recurrent Acute Otitis Media
Results:

- Patients in the OMT group had:
- Fewer episodes of AOM (p=.04)
- Fewer surgical procedures (p=.03)
  - (1 in OMT versus 8 in control)
- Increased frequency of normal tympanograms (p=.02)
- No adverse reactions reported

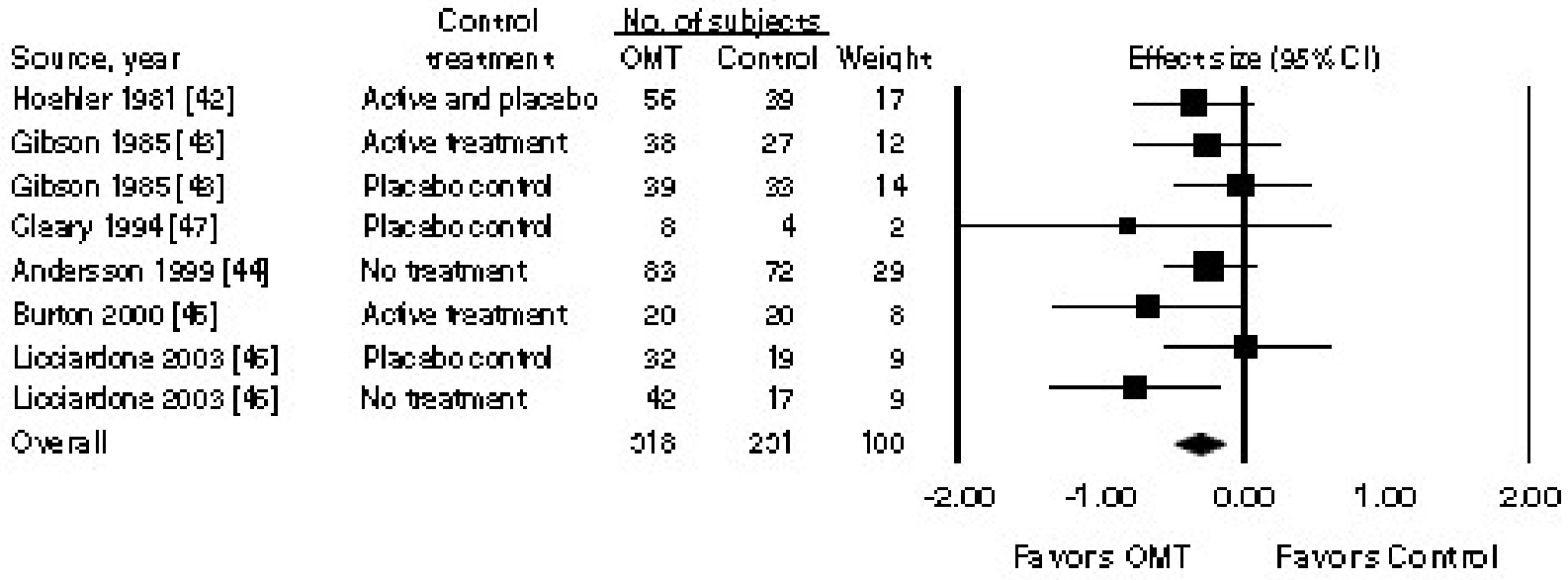
Low Back Pain Meta-analysis and Systematic Review (Licciardone et al 2005)

- 6 RCTs from 1973-2001
- 3 U.S. and 3 U.K.
- 525 patients with Low Back Pain
- Treated with OMT by Osteopathic Physicians

Low Back Pain Meta-analysis & Syst. Rev. Results:

- OMT significantly reduced LBP better than
  - both no treatment and placebo controls
  - (effect size, -0.30; 95% confidence interval, -0.47 to -0.13; P = .001)
- Pain relief persists for at least 3 months

Low Back Pain Meta-analysis and Systematic Review (Licciardone et al 2005)



AHRQ NGC: 007504 July 2009

- It is recommended that osteopathic manipulative treatment (OMT) be utilized by osteopathic physicians for musculoskeletal causes of low back pain, i.e., to treat the diagnoses of somatic dysfunctions related to the low back pain. (***Level of Evidence: 1a)***
- http://www.guideline.gov/index.aspx
  - Enter “OMT” in the search box

Hospitalized Elderly Patients with Pneumonia (Noll et al 2000)

- Patients over 60 years of age
- hospitalized with pneumonia (n= 58) were randomized to one of two groups:
  - standard care plus OMT (n=28)
  - standard care plus light touch sham OMT (n=30)
- OMT and light touch provided by osteopathic physicians in residency programs and an osteopathic physician specializing in OMT

Hospitalized Elderly Patients with Pneumonia

- OMT
  - paraspinal inhibition, rib raising, diaphragmatic myofascial release (redoming the diaphragm), condylar decompression, soft tissue cervical muscles, myofascial release to the anterior thoracic inlet, and the thoracic lymphatic pump
- Physicians making medical decisions in regards to treatment and discharge were blinded as to patient group allocation

Hosp. Elderly Patients with Pneumonia Results:

- Decreased duration of IV antibiotics (p=.002)
  - OMT group 5.3 ± 2.2 days
  - Light touch 7.3 ± 2.8 days
- Decreased length of stay (p=.014)
  - OMT group 6.6 ± 2.9 days
  - Light touch 8.6 ± 2.9 days

Hospitalized Elderly Patients with Pneumonia (Noll et al 2010)

- Multi-site (n=7)
- Patients over 50 years of age
- Hospitalized with pneumonia (n= 406) were randomized to one of three groups:
  - Conventional care only (CCO) (n=135)
  - CCO plus OMT 2x/day (n=135)
  - CCO plus light touch (LT) sham OMT 2x/day (n=136)

Hosp. Elderly Patients with Pneumonia

- 20 osteopathic neuromusculoskeletal (OMM) specialists and 64 resident physicians from 12 specialties administered the protocols
- Physicians managing the patients were blinded to the patients' group allocation
- OMT: thoracolumbar soft tissue, rib raising, doming of the diaphragm myofascial release, cervical spine soft tissue, suboccipital decompression, thoracic inlet myofascial release, thoracic lymphatic pump, and pedal lymphatic pump
- 1st OMT or LT within 24 hours of admission

Hosp. Elderly Patients with Pneumonia Results:

- Intention-to-treat analysis (n=387)
  - No significant difference between groups
- Per Protocol analysis (n=318)
  - Decreased median length of stay (p=.01) OMT v. CCO
  - OMT group (3.5 [3.2-4.0] days)
  - CCO group (4.5 [3.9-4.9] days)
  - LT group (3.9 [3.5-4.8] days) v. OMT not significantly different

Hosp. Elderly Patients with Pneumonia Results:

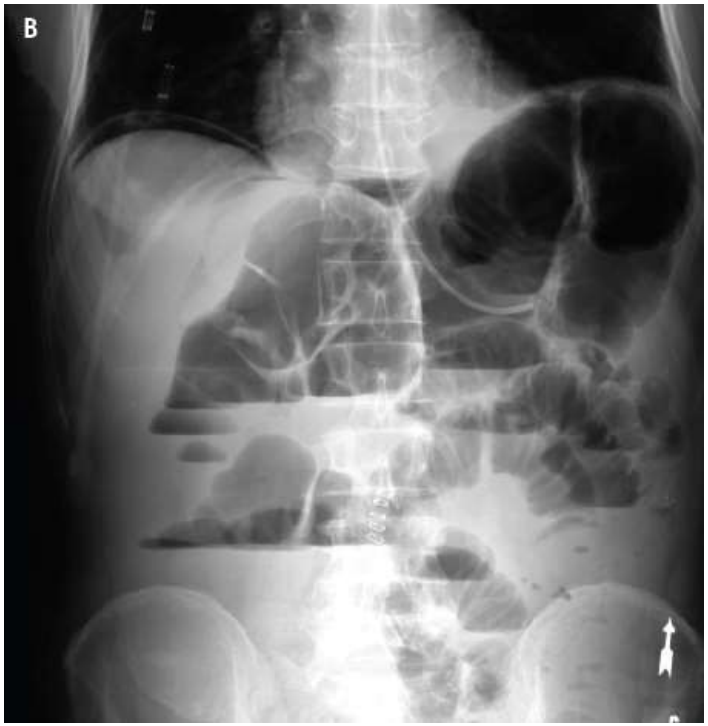
- Per Protocol Analysis (continued):
- Duration of intravenous antibiotics (p=.05) lower for OMT versus CCO, but not versus LT
- Death or respiratory failure (p=.006) lower for OMT versus CCO, but not versus the LT group

Number of Hospitalized Pneumonia Patients Needed to Treat with OMT to Prevent One Death

Occurrence of	**Control Event Rate (CER) Conventional Care**	**Exp. Event Rate (EER) OMT**	**Relative Risk Reduction (RRR) CER-EER/CER**	**Absolute Risk Reduction (ARR) CER-EER**	**Number Needed to Treat (NNT) 1/ARR**
Respiratory Failure (p=.006)	9/127 (7.1%)	1/96 (1.0%)	85.9%	6.1%	17
Death (p=.006)	**10/127 (7.9%)**	**0/96 (0.0%)**	**100%**	**7.9%**	**13**

Postoperative Ileus (Crow and Gorodinsky 2008)

- Retrospective
- Single Hospital 2003-06
- Patients with ileus following abdominal surgery
- 2 Groups
  - OMT (n=172)
  - Control (n=139)



Postoperative Ileus

- 6 surgeons (5DO & 1MD) made decision to consult for OMT
- OMT
  - 10 faculty (9DO & 1MD), 55 DO FM residents, osteopathic medical students
- Common sites treated:
  - OM suture, C T & L spine, ribs, diaphragm, sacrum, pelvis, thoracic duct, mesentery, ganglia (celiac, superior & inferior mesenteric)

Postoperative Ileus Results:

- Length of Stay (LOS)
  - OMT 11.8 days
  - Control 14.6 days
  - Age adjusted LOS difference 2.8 days
  - P = 0.029
    - analysis adjusted for age difference between groups

Postoperative Ileus Others:

- Ileus Prevention, OMT n=317, no OMT n=92
  - Incidence of Ileus: OMT 0.3%, no OMT 7.6%
  - Herrmann EP. Postoperative adynamic ileus: its prevention and treatment by osteopathic manipulation [Precepts and Practice]. The DO. 1965;6(2):163-164.
- Second Retrospective Study
  - OMT (n=17), LOS = 6.1 days
  - Control (n=38), LOS = 11.5 days p=0.006
  - Baltazar GA, Betler MP, Akella K, Khatri R, Asaro R, Chendrasekhar A. Effect of Osteopathic Manipulative Treatment on Incidence of Postoperative Ileus and Hospital Length of Stay in General Surgical Patients. J Am Osteopath Assoc. 2013;113(3):204-209.

ER Patients with Ankle Sprain (Eisenhart et al 2003)

- Adults who presented to an emergency department with a unilateral first- or second-degree acute ankle sprain (n=55) were randomized into two groups:
  - standard care plus OMT (n=28)
  - standard care (n=27)

ER Patients with Ankle Sprain

- OMT provided by osteopathic emergency medicine resident physician
- OMT: soft tissue, myofascial release, strain/counterstrain , and lymphatic
- Tibia, fibula, ankle and foot
- Blood SD. Treatment of the Sprained Ankle. J Am Osteopath Assoc, 1980, 79(11):680-692.

ER Patients with Ankle Sprain Results:

- Immediately after OMT
  - Decreased edema (P<.001)
  - Decreased pain (P<.001)
- One week later
  - Increased range of motion (P < .01)

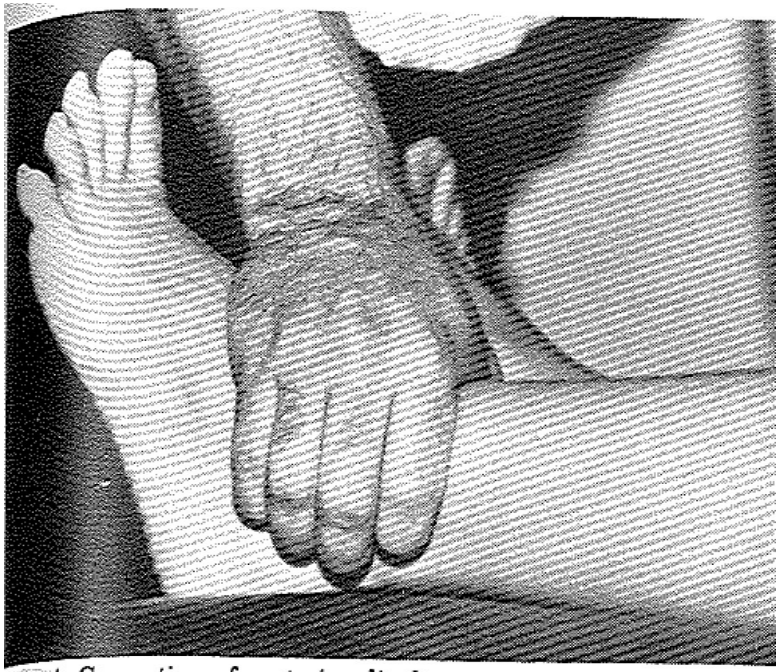


Fig. 4. *Correction of posterior displacement of the distal fibula.*]

Acute Neck pain (McReynolds and Sheridan 2005)

- Randomized Clinical Trial
- Patients with acute neck pain (less than 3 wks)
- Ages 18-50
- Presenting to Emergency Department
- 2 Groups
  - OMT (n=29)
  - IM Ketorolac (n=29)

Acute Neck pain

- Three osteopathic physicians that specialize in emergency medicine and routinely use OMT for patient treatment in the ED
- OMT
  - HVLA, soft-tissue, MET
- Pain scale (0-10)
  - Before and one hour post intervention

Acute Neck pain
Results:

- Both groups significant pain reduction ($p<.001$)
- Ketorolac
  - 5.6 ± 2.4 (pre) to 3.9 ± 2.7 (post)
- OMT
  - 6.1 ± 1.7 (pre) to 3.3 ± 1.9 (post)
- OMT group had significantly reduced pain compared to Ketorolac ($p=.02$)

Fibromyalgia (Gamber et al 2002)

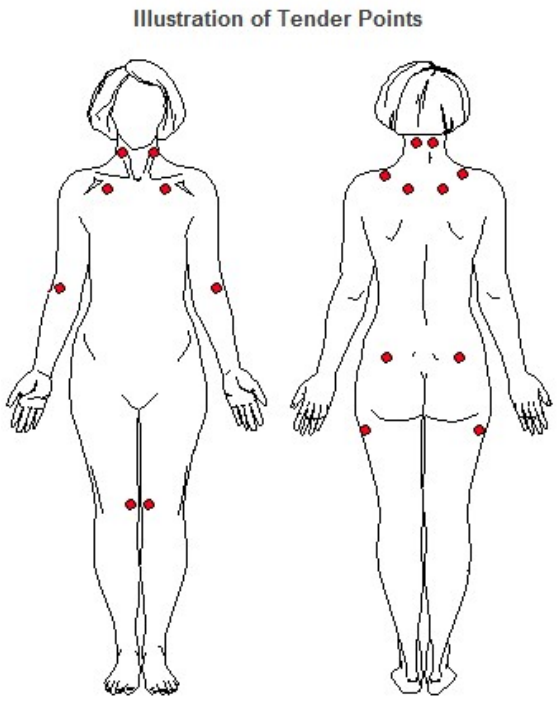
- Randomized, observer masked, placebo controlled
- Rheumatology Clinic patients diagnosed w FM
- 4 Groups (n=24) females ages 30-65
  - OMT
  - OMT + TP self-tx instructions
  - Moist heat to most troublesome TPs
  - Control group
- All groups continued their current meds

Fibromyalgia

- OMT
  - 15-30 minutes by OMT specialists, once per week
  - 6 months vs weeks 1, 2, 4, 7, 11, 15, 19, and 23
  - Counterstrain at most troublesome TPs
  - MFR, MET, soft tissue, cranial osteopathy
- Pain thresholds were measured at each of 10 bilateral TPs using a 9-kg dolorimeter

Fibromyalgia Results:

- OMT groups showed significant ($p<.05$) improvement
  - pain threshold
  - perceived pain
  - attitude toward treatment
  - activities of daily living
  - chronic pain



Additional Studies

Tension-type headaches (Hanten et all 1999)

- randomized controlled clinical trial
- chronic tension-type headaches (n=22)
- 3 groups:
  - standard care + OMT
  - standard care + palpatory diagnosis (placebo)
  - standard care + 10 minutes of relaxation (control)

Tension-type headaches
Results:

- OMT group versus control and placebo showed significant decrease in rated headache pain (P<.0003)

Chronic tension-type headaches (Anderson RE, et. al. 2006)

- single-blind, randomized
- I.H.S. 2004 Classification
- 2 groups (n=29)
  - Progressive Muscle Relaxation (PMR) (n=12)
  - PMR + OMT (n=14)
- Headache diary
  - 2 weeks before intervention
  - 6 to 7 weeks

Chronic tension-type headaches

- PMR exercises daily for 20 minutes
- OMT
  - 1X/week for 3 weeks
  - Pelvis, sacrum, upper T-spine, upper rib cage, C-spine, head
  - MFR, stretching, inhibition, BLT, MET, counterstrain, articular, cranial

Chronic tension-type headaches
Results:

- OMT + PMR group versus PMR only:

  Increased HA-free days (p=.016)

- PMR participation
  - OMT + PMR 78%
  - PMR 76%

Infantile Colic
(Haydena & Mullingerb 2006)

- randomized, prospective
- 28 infants
- 2 groups
  - OMT
  - No OMT

Infantile Colic

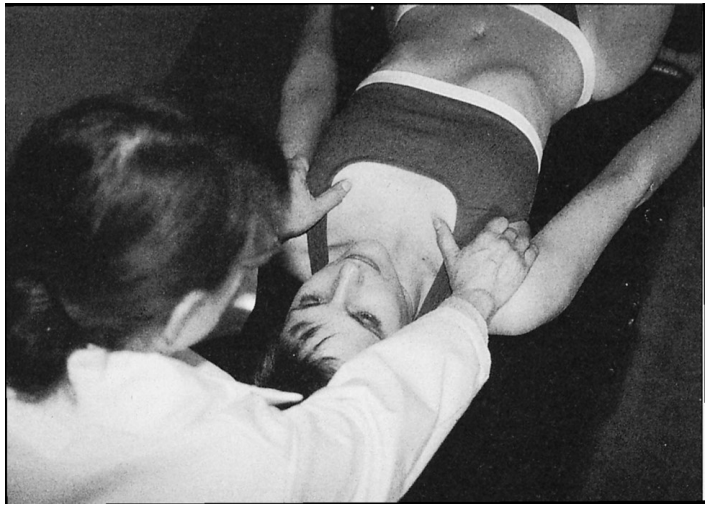
- OMT
  - All seen 1x/week for 4 weeks
  - One physician provided treatment
  - Cranial osteopathic manipulation based on individual findings

Infantile Colic Results:

- Progressive decline from weeks 1 – 4
- Time spent crying (hours/24h)
  - OMT 63% reduction ($p<.001$)
  - Controls 23% reduction
- Time spent sleeping
  - OMT 11% increase ($p<.002$)
  - Controls 2% increase
- Required less parental attention

Patients Hospitalized with Pancreatitis (Radjieski et al 1998)

- Hospitalized adult patients with uncomplicated pancreatitis (n= 14)
- Randomly assigned to two groups:
  - six received standard care plus OMT;
  - the rest received standard care only.



Patients Hospitalized with Pancreatitis

- OMT was provided by an osteopathic family medicine resident physician
- Mobilization of the hips, pelvis, shoulders, sacrum, spine and ribs using standard myofascial release, articulatory and muscle energy procedures
- Tenderpoints found on the torso, spine and extremities were treated with standard strain/counterstrain
- Physicians making medical decisions in regards to treatment and discharge were blinded as to patient group allocation

Patients Hospitalized with Pancreatitis Results:

- Patients in the OMT group spent significantly fewer days in the hospital before discharge (mean reduction of 3.5 days, p< .039).

Table 4
Hospitalization Variables for Group Receiving Osteopathic Manipulative Treatment (OMT) Versus Control Group

	OMT group (n=6)		Control group (n=8)			
Variable	Mean	SD	Mean	SD	*t*	*P*
☐ Days in hospital	4.5	1.4	8.1	3.9	2.41	.039
☐ Days with no oral intake	2.2	1.2	1.9	1.9	0.33	.74
☐ Requests for pain medication	2.0	1.7	1.1	0.9	1.1	.27

OMT during Pregnancy (King et al 2003)

- Retrospective study in 4 cities
- Women who received OMT throughout pregnancy (n=160)
- Women who did not (n=161)
- OMT included HVLA, MET, MFR, BLT, BMT, CS
  - Treating physician's choice

OMT during Pregnancy
Results:

- decreased frequency of meconium-stained amniotic fluid ($P<.001$)
- decreased occurrence of preterm delivery ($P<.01$)
- decrease in the use of forceps
  - Not significant ($P < .07$)

Ambulatory adults with low back pain (Anderson et al 1999)

- randomized, controlled, clinical trial
- subacute low back pain
  - (greater than 6 weeks but less than 3 months)
- patients ages 20-59 (n=155)
  - MD (n=72) vs. DO (n=83)
- evaluated pain, disability, activities

Ambulatory adults with low back pain

- DOs could prescribe medicine and order physical therapy, but the MDs and PTs were restricted in that they could not perform manipulation, whereas the DOs could
- Only patients with lumbar, sacral or pelvic somatic dysfunction diagnosis were included in the study before randomization
- OMT was performed by DOs who specialized in OMT

Ambulatory adults with low back pain
Results:

- DOs prescribed fewer medications
  - NSAIDS used DOs (24%) vs. MDs (54%)
  - muscle relaxants used DOs (6%) vs. MDs (25%)
- DOs referred less to physical therapy
  - (0.2% for DOs vs. 2.6% for MDs)
- Patients were equally satisfied with either treatment methods
- Otherwise outcomes similar

OMT during Pregnancy (King et al 2003)

Table 2
Number of Deliveries with Osteopathic Manipulative Treatment, Prenatal Care, and Postnatal Care by Center

Center	N	MSAF, No. (%)	PTD, No. (%)	UCP, No. (%)	Use of Forceps, No. (%)	CSD, No. (%)
Received OMT						
Chicago	50	3 (6)	2 (4)	0 (0)	0 (0)	9 (18)
Kirksville	44	4 (9)	3 (7)	0 (0)	5 (11)	5 (11)
Maine	21	3 (14)	0 (0)	0 (0)	2 (10)	3 (14)
San Diego	45	2 (4)	1 (2)	0 (0)	3 (7)	9 (20)
Total	**160**	**12 (8)**	**6 (4)**	**0 (0)**	**10 (6)**	**26 (16)**
Did Not Receive OMT						
Chicago	50	13 (26)	6 (12)	0 (0)	1 (2)	3 (6)
Kirksville	44	6 (14)	4 (9)	0 (0)	6 (14)	15 (34)
Maine	21	4 (19)	2 (10)	0 (0)	2 (10)	1 (5)
San Diego	46	11 (24)	7 (15)	0 (0)	8 (17)	10 (22)
Total	**161**	**34 (21)**	**19 (12)**	**0 (0)**	**17 (11)**	**29 (18)**

OMT indicates osteopathic manipulative treatment; MSAF, meconium-stained amniotic fluid; PTD, preterm delivery; UCP, umbilical cord prolapse; CSD, cesarean section delivery.

OMT for back pain during 3rd trimester pregnancy (Licciardone et al 2009)

- randomized, placebo-controlled trial
- 3 treatment groups
  - usual obstetric care (UOBC) + OMT (n=49)
  - UOBC + sham ultrasound tx. (SUT) (n=48)
  - UOBC (n=48)
- Roland-Morris Disability Questionnaire (RMDQ)
  - to assess back-specific functioning

OMT for back pain during 3rd trimester pregnancy

- Seven 30 minute treatments at 30-39 weeks
- OMT
  - C, T, L-spine, rib cage, sacrum, pelvis
  - Soft tissue, MFR, MET, articular
  - No HVLA, no CV-4
- SUT
  - Same physicians as provided OMT
  - Non-functional machine over similar landmarks as OMT

OMT for back pain during 3rd trim. Preg. Results:

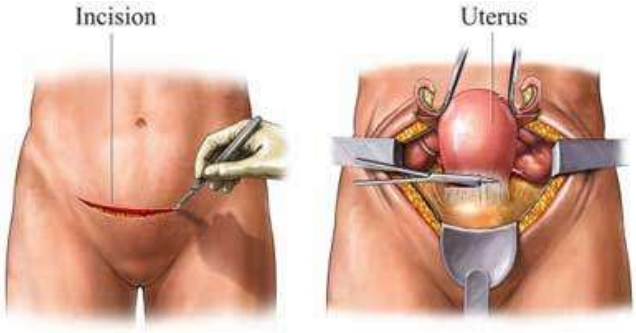
- Intention-to-treat analysis n=144
- RMDQ back-specific inventory declined less
  - UOBC + OMT versus UOBC (p=.001)
  - UOBC + OMT versus UOBC + SUT (p=.09) not signif.
- Back pain (0 to 10 interval)
  - No significant differences between groups

Post operative pain after Total Abd. Hyst. (Goldstein et al 2005)

- Randomized double-blind controlled trial
- 4 Groups
  1. Pre-op saline and post-op sham OMT (n=9)
  2. Pre-op saline and post-op OMT (n=10)
  3. Pre-op morphine and post-op sham OMT (n=10)
  4. Pre-op morphine and post-op OMT (n=10)
- Standard medical and surgical care

Post operative pain after Total Abd. Hyst.

- IV saline or morphine 10 minutes before incision
- OMT
  - Sacrum, lumbar, lower thoracic
  - Myofascial release and soft tissue (15 minutes)
  - 4 hrs post-op, POD #1 8am & 2pm

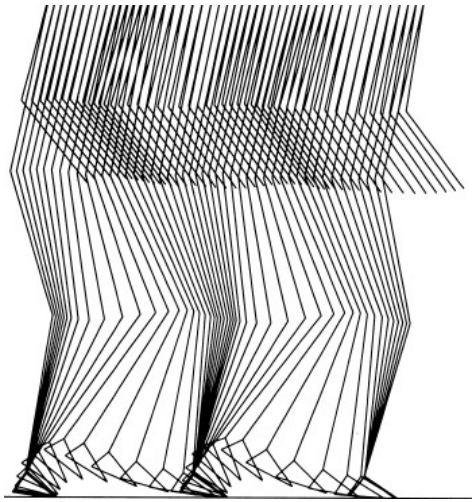


Post operative pain after Total Abd. Hyst. Results:

- After surgery, all received morphine via an IV patient-controlled analgesia pump
- Group 4 used less morphine than Group 3
  - First 24 hours (p=.02)
  - 25-48 hours (p=.01)
- No difference between the 4 groups for:
  - Pain, nausea, vomiting

Parkinson's disease and gait (Wells MR, et. al. 1999)

- Mild to moderate Parkinson's disease (PD)
- 3 groups ages 45-58
  - OMT protocol
    - Parkinson (n=10)
    - Normal (n=8)
  - Sham OMT protocol
    - Parkinson (n=10)



- Gait analysis reflective markers and camera system
  - 40 foot walk pre and post intervention

Parkinson's disease and gait

- 12 hour medication washout
- Student physician provided OMT & Sham
- OMT-one standard 30 minute protocol
  - 14 techniques performed in sequence from OA to feet
- Sham-one standard 30 minute protocol
  - Voluntary ROM of joints treated in OMT protocol

Parkinson's disease and gait
Results:

- Stride length
  - PD OMT increased ($p<.02$)
  - Sham & Normal groups no change
- Cadence
  - PD OMT increased ($p<.005$)
  - Sham & Normal groups decreased to no change

- Significant changes in maximum velocities of lower limb joints

Pediatric Patients with Asthma (Guiney PA, et.al. 2005)

- Pediatric Patients with Asthma
- Randomized (2:1 assignment ratio)
- Ages 5-17
- 2 groups
  - OMT (n=90)
  - Sham (n=50)
- Measured Peak Expiratory Flow (best of 3)
  - pre and post intervention

Pediatric Patients with Asthma

- OMT
  - Rib raising, MFR, MET
- Sham
  - Performed by MD pediatrician
  - Placed hands in similar positions as the OMT group

Pediatric Patients with Asthma Results:

Table 3
Peak Expiratory Flow Rates for Pediatric Patients with Asthma
Summary of *t* Test Analysis (Liters Per Minute)

	Difference	Percent Difference
Group	**Mean (95% CI)***	
Osteopathic Manipulative Treatment (n=90)	13.0 (7.3 to 18.7)	4.8 (2.7 to 6.9)
Control (n=50)	0.3 (−9.8 to 10.4)	1.4 (−1.8 to 4.5)

* CI indicates confidence interval.

Post Coronary Artery Bypass Graft surgery (O-Yurvati et al 2005)

- Prospective
- 2 groups ages 56-79 undergoing CABG
  - OMT (n=10)
  - Matched controls (n=19)
- Cardiac index=cardiac output (L/min)/body surface area (m2)
- SvO2, an indicator of peripheral oxygen consumption (pulmonary artery)
- Thoracic Impedance
  - Increases as central blood volume decreases

Post Coronary Artery Bypass Graft Surgery

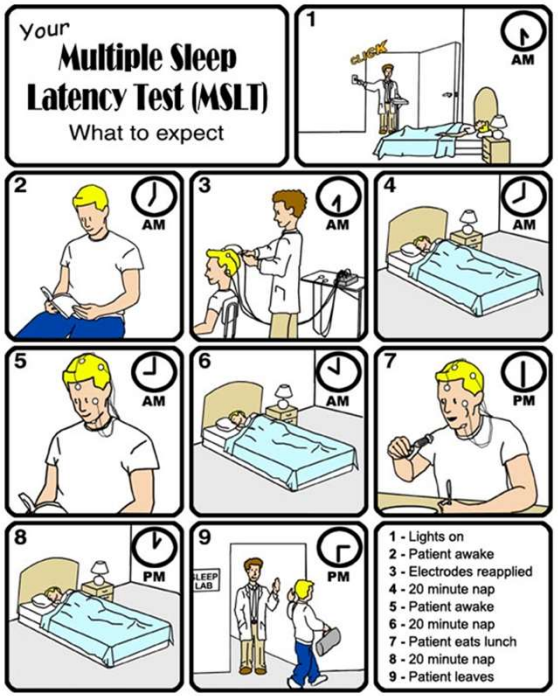
- OMT
  - Osteopathic Physicians specializing in OMT
  - OMT within 2 hours of the end of surgery
    - Patients still sedated and pharmacologically paralyzed
  - T-spine and ribs first, the diaphragm, sternum third, and upper c-spine last
  - BLT, MFR, rib raising, OA decompression, Sibson's fascia release
- Hemodynamic measures
  - 1 and 2 hours post-op

Post Coronary Artery Bypass Graft Surgery Results:

- SvO2
  - Increased Pre vs Post OMT ($p<.005$)
  - OMT group increased versus control ($p<.005$)
- Cardiac Index
  - Increased Pre vs Post OMT ($p<.01$)
  - OMT group increased versus control ($p<.02$)
- Thoracic Impedance
  - Increased Pre vs Post OMT ($p<.02$)
  - Not measured for control group

Sleep (Cutler et al 2005)

- 20 healthy volunteers, ages 22-35
- 3 Groups, randomized assignment
  - OMT
  - Sham, light touch
  - Control



Sleep

- OMT
  - Compression fourth ventricle (CV-4)
- Sleep Latency
  - standard Multiple Sleep Latency Test protocol
- MSNA
  - muscle sympathetic nerve activity (MSNA) as a potential mechanism for altered sleep latency
  - Microneurography direct recording of sympathetic nerve activity representing postganglionic vasoconstrictor nerve activity

Sleep Results:

- Sleep Latency
  - OMT decreased versus sham or control ($p<.05$)
- MSNA
  - Decreased post versus pre OMT ($p<.01$)
  - OMT decreased versus sham or control ($p<.05$)
  - Sham and control no significant change ($p>.80$)

References

- Andersson GBJ, Lucente T, Davis AM et al. A comparison of osteopathic spinal manipulation with standard care for patients with low back pain. NEJM, Nov 4, 1999: 1426-1431.
- Anderson RE, Seniscal C. A comparison of selected osteopathic treatment and relaxation for tension-type headaches. Headache 2006;46:1273–80.
- Baltazar GA, Betler MP, Akella K, Khatri R, Asaro R, Chendrasekhar A. Effect of Osteopathic Manipulative Treatment on Incidence of Postoperative Ileus and Hospital Length of Stay in General Surgical Patients. J Am Osteopath Assoc. 2013;113(3):204-209.
- Blood SD. Treatment of the Sprained Ankle. J Am Osteopath Assoc, 1980, 79(11):680-692.
- Cerritelli F, et. al. Clinical Effectiveness of osteopathic treatment in chronic migraine: 3-Armed randomized controlled trial. Complementary Therapies in Medicine, 2015, 23, 149-156.
- Crow WT, Gorodinsky L. Does osteopathic manipulative treatment improve outcomes in patients who develop postoperative ileus: a retrospective review. Int J Osteopath Med. 2009;12(1):32-37.
- Cutler MJ, Holland BS, Stupski BA, Gamber RG, Smith ML. Cranial manipulation can alter sleep latency and sympathetic nerve activity in humans: A pilot study. J Altern Comp Med, 2005,11(1):103-108.
- Eisenhart AW, Gaeta TJ, Yens DP. Osteopathic manipulative treatment in the emergency department for patients with acute ankle injuries. J Am Osteopath Assoc, 2003, 103(9):417-421.
- Gamber RG, Shores JH, Russo DP, Jimenez C, Rubin BR. Osteopathic manipulative treatment in conjunction with medication relieves pain associated with fibromyalgia syndrome: results of a randomized clinical pilot project. J Am Osteopath Assoc, 2002,102:321–325.
- Goldstein, F., et. al., F, Jeck S, Nicholas AS, Berman, MJ, Lerario M. Effect of pre-emptive morphine and postoperative osteopathic manipulative technique on pain following total abdominal hysterectomy: a pilot study. J Am Osteopath Assoc, 2005,105(6):273-279.
- Guiney PA, Chou R, Vianna A, Lovenheim J. Effects of Osteopathic Manipulative Treatment on Pediatric Patients With Asthma: A Randomized Controlled Trial. J Am Osteopath Assoc, 2005, 105(1): 7-12**.**
- Hanten WP, Olson SL, Hodson JL, Imler VL, Knab VM, Magee JL. The effectiveness of CV4 and resting position techniques on subjects with tension-type headaches. J Man Manip Ther, 1999,7:64-70.

References

- Haydena C, Mullinger B. A preliminary assessment of the impact of cranial osteopathy for the relief of infantile colic. Complement Ther Clin Pract 2006;12:83–90.
- Herrmann EP. Postoperative adynamic ileus: its prevention and treatment by osteopathic manipulation [Precepts and Practice]. The DO. 1965;6(2):163-164.
- King HH, Tettambel MA, Lockwood MD, Johnson KH, Arsenault DA, Quist R. Osteopathic Manipulative Treatment in Prenatal Care: A Retrospective Case Control Design Study. J Am Osteopath Assoc, 2003,103 (12): 577-582.
- Licciardone JC, Brimhall AK, King LN. Osteopathic manipulative treatment for low back pain: a systematic review and meta-analysis of randomized controlled trials. BMC Musculoskelet Disord, 2005;6:43. Available at http://www.biomedcentral.com/1471-2474/6/43/
- Licciardone JC, Buchanan S, Hensel KL, King HH, Fulda KG and Stoll ST. Osteopathic manipulative treatment of back pain and related symptoms during pregnancy: a randomized controlled trial. Am J Obstet Gynecol. Online Sept 19, 2009. doi:10.1016/j.ajog.2009.07.057
- McReynolds TM, Sheridan BJ. Intramuscular Ketorolac versus osteopathic manipulative treatment in the management of acute neck pain in the emergency department: a randomized clinical trial, J Am Osteopath Assoc, 2005,105(2):57-68.
- Mills MV, Henley CE, Barnes LLB, Carreiro JE, Degenhardt BF. The use of osteopathic manipulative treatment as adjuvant therapy in children with recurrent acute otitis media. Arch Pediatr Adolesc Med, 2003, 157: 861-866.

References

- Noll DR, Shores JH, Gamber RG, et al. Benefits of osteopathic manipulative treatment for hospitalized elderly patients with pneumonia. *J Am Osteopath Assoc*. Dec 2000;100(12):776-82. Comment in: J Am Osteopath Assoc. 2001,101(8):427-8.
- Noll DR, et al. Efficacy of osteopathic manipulation as an adjunctive treatment for hospitalized patients with pneumonia: a randomized controlled trial. Osteopathic Medicine and Primary Care 2010, 4:2; available online at http://www.om-pc.com/content/4/1/2.
- O-Yurvati AH, Carnes MS, Clearfield MB, Stoll ST, McConathy WJ. Hemodynamic effects of osteopathic manipulative treatment immediately after coronary artery bypass graft surgery. J Am Osteopath Assoc, 2005,105(10):475-481.
- Plotkin BJ, Rodos JJ, Kappler R, Schrage M, Freydl K, Hasegawa S et al. Adjunctive osteopathic manipulative treatment in women with depression: a pilot study. J Am Osteopath Assoc**.** 2001,101(9),517-523.
- Radjieski JM, Lumley MA, Cantieri MS. Effect of osteopathic manipulative treatment on length of stay for pancreatitis: a randomized pilot study [published correction appears in J Am Osteopath Assoc. 1998;98:408]. J Am Osteopath Assoc. 1998,98:264–272.
- Wells MR, et al. Standard osteopathic manipulative treatment acutely improves gait performance in patients with Parkinson's disease. J Am Osteopath Assoc**.** 1999,99(2),92-98.