OSTEOPATHIC CONSIDERATIONS IN GERIATRICS

Michael F. Oliverio, D.O.
C-F.P., C-NMM-OMM
Presented on behalf of the NYIT College of Osteopathic Medicine
Faculty Development in Primary Care Grant
#D55HP23200
REFERENCES

- Foundations of Osteopathic Medicine 2nd Ed. p.230-231, 327-337
- Foundations of Osteopathic Medicine 3rd Ed. p.873-882
- JAOA online
  - www.do-online.org
OSTEOPATHIC PHILOSOPHY

- Body is a Unit
- Structure and Function are reciprocally interrelated
- The body possesses self-regulatory mechanisms
- The body has the inherent capacity to defend and repair itself
- When adaptability is disrupted disease can ensue
- Rational treatment is based on these principles
COROLLARIES

- Movement of body fluids is essential to health
- The nervous system plays a crucial part in controlling the body
- Somatic components are not only manifestations of disease, they contribute to the maintenance of the diseased state
SOMATIC DYSFUNCTION

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

- Somatic dysfunction is treatable using osteopathic manipulative treatment.
T-A-R-T

- Tissue texture abnormality
- Asymmetrical motion
- Restricted motion
- (+/-) Tenderness
TART CHANGES

- should be interpreted in context of aging
- elastin loss with changes in muscle tone and turgor
- Tenderness can be a guide to onset of new dysfunction
FIVE “I’S”

- Impaired Homeostasis
- Incompetence or Intellectual Impairment
- Iatrogenesis
- Immobility
- Incontinence
IATROGENESIS

- polypharmacy
  - altered pharmacokinetics
- immobility
  - decubitus ulcers, pneumonia, PE
- unnecessary hospitalization
  - nosocomial infection
GOALS OF TREATMENT

- maximize the patient’s residual functional capacity to meet patient-centered goals of care for an optimal quality of life
BIO-MECHANICAL MODEL

- No specific bio-mechanical changes associated with dementia
- There is an increased incidence of protein cross linking in the soft tissues and a loss of elastin
  - a generalized stiffening and slowness of reaction
- Loss of subcutaneous fat and subcutaneous tissues leading to vulnerability to trauma
TYPICAL CHANGES

- loss of height with preservation of arm span
  - loss of disc hydration and osteoporosis
- Flexion posture
FLEXION POSTURE

- loss of hip and knee extension which limits lumbar flexion
- Flattened lumbar lordosis
- Increased thoracic kyphosisis and cervical lordosis
- Cranial sutures calcify
APPLICATION OF OMT

- Muscle energy may be helpful with Parkinson Disease
  - Standard osteopathic manipulative treatment acutely improves gait performance in patients with Parkinson's disease
    - JAOA February 1, 1999
- Avoidance of thrust and impulse techniques due to osteopenia/porosis
BEHAVIORAL ASPECT

- According to Erikson in old age the competing drives are integrity vs despair
  - despair is related to the knowledge that life span is limited
  - integrity relates to a sort of wisdom and perspective that comes from experience
MATURATION

- elders begin to look inward for a sense of meaning and accept their accomplishments in life as adequate
- many cultures view the elderly as carriers of culture and memory and repositories of wisdom and judgement
THEORIES OF AGING
decline in organ reserve due to diminishing effects of the immune system

transcription theory: cell’s limited ability to repair transcriptional errors
OXIDATIVE STRESS

- during metabolism oxygen is converted into superoxide anions, H2O2, and -OH radicals leading to damage over time.
OTHER THEORIES

- error theory
- redundancy failure
- cross linkage
PHYSIOLOGY

- there is significant individual variation
  - chronologic vs physiologic age
- changes with age are linear, but cumulative
  - usually begin in the third decade
BODY COMPOSITION CHANGES

- decrease in height, lean body mass, and body water
- increase in body fat
- these lead to an alteration in the volume of distribution of medications altering pharmacokinetics
DERMATOLOGIC CHANGES

- decrease in subcutaneous fat
- loss of sweat glands
- capillary fragility
SPECIAL SENSES

- loss of ocular lens elasticity
  - presbyopia, inability to read fine print
- loss of auditory neurons and cochlear hair cells
  - presbycusis, loss of high frequency hearing
CNS CHANGES

- loss of brain weight
- diminution of neuro transmitters
- decline in memory
- increased postural instability
MUSCULOSKELETAL CHANGES

- loss of muscle mass
- decrease in bone density
CARDIOVASCULAR

- Increase in systolic and diastolic bp
- Calcification and sclerosis of valves
- Decreased cardiac output with demand
PULMONARY CHANGES

- decline in alveolar surface area
- decrease in vital capacity
- decrease in pAO2
RENAL CHANGES

- decline in the number of nephrons with resultant decrease in creatinine clearance
- remember decrease in muscle mass with aging will also impact this
IMMUNOLOGICAL CHANGES

- decrease in T-Cell function
- decrease in antibody production
- increase in auto-antibodies
LAB VALUES THAT DON’T CHANGE

- Bili, AST, ALT, GGTP
- Coags
- Serum Electrolytes, Protein, CA, Phos, Folate
- Creatinine
- T4
- Hgb, Hct, Plt
LABS THAT DO CHANGE

- ESR and Glucose INCREASE
- Cr. Clearance and Albumin DECREASE
PITFALLS

- NSAIDS: GI and Renal toxicity
- Osteoporosis: Avoid HVLA
OMT - TECHNIQUES

- ROM
- ME
- OCF
- CS
- MF
- Spencer Technique
EFFECT OF OSTEOPATHIC MANIPULATION ON POSTURAL STABILITY IN THE ELDERLY

- Daniel Lopez, DO; Hollis H. King, DO, PhD; Janice A. Knebl, DO; Victor Kosmopoulos, PhD; DeRaan Collins, BS; Rita M. Patterson, PhD

- JAOA: 2011 June

- Randomized controlled pilot study

- 40 adults 65yrs and older received OMT weekly for 4 weeks and had improvements in balance with respect to controls
OMT PROTOCOL

- Soft tissue and MFR T1-L5 and Sacral rocking (3-4 mins)
- MFR to shoulders and scapulae bilaterally (4-5 mins)
- MF, CS, MFR to C-Spine (3-4 mins)
- OA and Condylar decompression (1-2 mins)
- Venous sinus drainage (2-3 mins)
- V-Spread, Frontal, and Parietal Lifts (3-4 mins)
- CV4 (3-4 mins)
- Recheck
- Total: 19-26 mins 98928 !
IMMEDIATE EFFECTS OF OSTEOPATHIC MANIPULATIVE TREATMENT IN ELDERLY PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

- Donald R. Noll, DO; Brian F. Degenhardt, DO; Jane C. Johnson, MA; Selina A. Burt, DO

- JAOA May 1, 2008
STUDY DESIGN

- Adults 65 years or older with an FEV-1 to forced vital capacity ratio of less than 70% were recruited and randomly assigned to receive either OMT or sham therapy.

- The OMT protocol consisted of seven standardized osteopathic manipulative techniques, while the sham therapy protocol comprised light touch applied to the same anatomic regions and for the same duration (20 min).

- All subjects received baseline and post-treatment pulmonary function testing.
The seven standardized osteopathic manipulative techniques used during each osteopathic manipulative treatment protocol session, which lasted approximately 20 minutes.

- **Soft Tissue**
  - Operator kneaded (massaged) the subject's paraspinal muscles.

- **Rib Raising**
  - Operator stood or sat at the subject's side and placed his hands under the subject's thorax, contacting the rib angles with the pads of the fingers. With his fingers flexed, the operator applied traction to the rib angle. While maintaining traction, the operator used his arm as a fulcrum with the wrists straight to raise the subject's rib angle anteriorly (upward). This motion was repeated several times until improved rib function was obtained.

- **“Redoming” the Abdominal Diaphragm (Indirect Myofascial Release)**
  - One of the operator's hands was placed under the subject where the diaphragmatic muscles attach to the lower ribs and vertebrae (thoracolumbar junction). The other hand was placed on the abdominal epigastric area. The operator rotated his hands in opposite directions to determine the direction of greatest freedom of movement. Then, tissues were moved in the direction of greatest freedom to a point of “balance” and held there until a release of tissue tension or restriction was palpated.

- **Suboccipital Decompression**
  - The operator stood or sat at the head of the table. The tips of the fingers were placed on the occipital condyles at the base of the head. Outward and cephalad traction was applied to decompress the occipital joint.

- **Thoracic Inlet Myofascial Release**
  - The operator sat or stood at the head of the table and placed his hands over the thoracic inlet, thumbs posteriorly over the angle of the first ribs and fingers anteriorly over the clavicle. Passive motion testing determined the direction in which the tissues moved most freely, and then those tissues were held in that position until a relaxation or “release” of the tissues was palpated. If still restricted, the tissues were taken in the direction of least motion to relieve the restriction.

- **Pectoral Traction**
  - The operator stood at the head of the table. The inferior border of the pectoralis muscle was grasped and cephalad traction applied, aided by respiration. Gentle traction was maintained until release of upper respiratory muscle tension was palpated.

- **Thoracic Lymphatic Pump With Activation**
  - Operator's hands were placed on the thoracic wall with the thenar eminence of each hand over the pectoralis muscles just below the clavicle; fingers were spread and angled toward the sides of the subject's body. The subject took a deep breath in and then exhaled. During exhalation, the operator induced rhythmic pumping action by alternating pressure on the chest wall. At the end of exhalation, some pressure was maintained on the chest wall, and the subject was told to take another deep breath. This procedure was repeated several times, each time building more pressure on the thoracic wall. On the fourth or fifth inhalation and during the first one-third of the inhalation, the hands were quickly removed from the chest wall, creating a sudden increase in negative intrathoracic pressure and causing air to rush into the subject's lungs. This cycle was repeated three times in the study protocol.
RESULTS

- Compared with the sham group, the OMT group showed a statistically significant decrease in the forced expiratory flow at 25% and 50% of vital capacity and at the mid-expiratory phase; the expiratory reserve volume; and airway resistance.

- The OMT group also had a statistically significant increase in the residual volume, total lung capacity, and the ratio of those values compared with the sham group. Most subjects (82%, OMT group; 65%, sham group) reported breathing better after receiving their treatment.
The results of the present study support our primary hypothesis that a single multitechnique OMT session produces measurable changes in pulmonary function parameters. However, the overall pattern suggests a worsening of airway obstruction rather than an improvement.

Certainly, an increase in RV in a patient with COPD—a disease characterized by air trapping and an already-elevated RV—is not a desirable change. Although some changes can be interpreted as beneficial, such as the increase in IC, the increase in RV is greater as evidenced by the increase in the RV/TLC ratio.

We speculate that the “activation” component of the thoracic lymphatic pump technique used in the protocol was primarily responsible for the increase in RV because the activation portion of the technique promotes a sudden rush of air into the lungs. This air rush may not be fully exhaled in the context of airway resistance. Modifying the technique to avoid activation may eliminate the problem of increased RV. In addition, the decrease in airway resistance more likely reflects the overall increase in lung volume than diminished bronchoconstriction. In other words, as lung volume increases, airways widen and the resistance lessens.

Several limitations should be considered when interpreting the results of the present study. The protocol used to treat subjects in the OMT group comprised multiple techniques; therefore, it is impossible to know the contribution of each individual technique to the final outcome. For example, a technique with a beneficial effect may have been canceled out by one with an adverse effect. Likewise, as described in a 1980 study, too many techniques or too long of a treatment duration may result in an overdose of OMT. In addition, though some pulmonary function parameters worsened 30 minutes posttreatment, the long-term effects were not explored. Future studies should examine the effect of individual techniques on the pulmonary system. Such techniques and protocols could then be fine-tuned for better efficacy.
CONCLUSIONS

- Pulmonary function testing can be used to evaluate the effects of one multitechnique OMT session on the respiratory system.

- However, the results suggest an overall worsening of air trapping during the 30 minutes immediately after one multitechnique OMT session relative to a sham control group.

- Future studies should evaluate the effects of individual techniques on the respiratory system because each individual technique may have separate beneficial or harmful effects.

- Some caution should be used when using OMT in elderly patients with COPD, especially the protocol used in the present study, because pulmonary function may worsen initially after treatment.
PREVENTATIVE OSTEOPATHIC MANIPULATIVE TREATMENT AND THE ELDERLY NURSING HOME RESIDENT: A PILOT STUDY

- Karen T. Snider, MS, DO; Eric J. Snider, DO; Jane C. Johnson, MA; Celia Hagan, RN, BSN, CCRC; Conrad Schoenwald, DO

- JAOA August 1, 2012
INCLUSION / EXCLUSION CRITERIA

- Men and women aged 65 to 100 years who were residents of 1 of 2 area nursing homes in Kirksville, Missouri

- Exclusion criteria were life expectancy of less than 6 months, terminal cancer, active tuberculosis, inability to cooperate with the treating physicians, inability to tolerate OMT, and known metabolic bone disease that would put the resident at risk for a pathological fracture, such as Paget disease or hypoparathyroidism.
TREATMENT PROTOCOLS

- Participants in the OMT and LT groups received a focused musculoskeletal physical examination twice a month for 5 months (10 visits). This physical examination included evaluation of the cervical, thoracic, and lumbar spine; sacrum; pelvis; and ribs.

- The OMT group received an OMT protocol at each visit that addressed optimization of homeostatic mechanisms and targeted somatic dysfunction found during that visit’s physical examination.

- OMT performed on the basis of a standardized protocol meant to optimize autonomic nervous system functioning and lymphatic drainage.

  - Within the confines of the OMT protocol, the treating physicians could perform direct, indirect, or combined techniques to the thoracic inlet and abdominal diaphragm regions.

  - Physicians were also expected to treat all clinically significant somatic dysfunctions found during that visit’s physical examination.
Any OMT provided outside the standardized protocol was applied on the basis of the physical examination findings, and techniques were at the discretion of the treating physician.

The following OMT techniques could be used: articulatory/springing; balanced ligamentous tension; cranial; facilitated positional release; high-velocity, low-amplitude; muscle energy; myofascial release; soft tissue; Still; strain-counterstrain; and visceral manipulation.

Because most of the nursing home residents were sedentary and likely to have osteoporosis, the treating physicians adjusted the OMT to stay within the tolerance of the participants. Participants were informed that some soreness could be expected because tight muscles would be stretched and joints would be mobilized as part of improving musculoskeletal function.
Osteopathic manipulative treatment protocol administered to nursing home residents.

1. Focused osteopathic musculoskeletal examination
2. Paraspinal muscle inhibition and/or soft tissue kneading or stretching (1-2 minutes)
3. Rib raising and/or rib mobilization (45-60 seconds)
4. Abdominal diaphragm release technique (20-60 seconds)
5. Abdominal mesenteric/colon release technique (20-60 seconds)
6. Thoracic inlet release technique (20-60 seconds)
7. Hip flexion/extension passive range of motion technique (20-60 seconds)
8. Shoulder range of motion with pectoral traction (20-60 seconds)
9. Cervical paraspinal muscle inhibition and/or soft tissue kneading or stretching (30-60 seconds)
10. Suboccipital release technique (15-30 seconds)
11. Variable techniques to treat clinically significant somatic dysfunction of each participant

RESULTS

- 22 participants enrolled in the study, 21 participants completed the study—8 in the OMT group, 6 in the LT group, and 7 in the TAU group.

- Data on hospitalizations, emergency room visits, outpatient procedures, and mortality

- There was a significant difference between the groups on the number of hospitalizations during the study period (P=.04), with the OMT and LT groups having fewer hospitalizations (0 in both groups) than the TAU group (3 participants had 1 or more hospitalizations).

- There was no significant difference between the groups for the number of emergency room visits (P=.38) or outpatient procedures (P=.62). No participants died during the study period.
CONCLUSIONS

- Twice monthly OMT and LT protocols reduced the number of hospitalizations and decreased medication usage in elderly nursing home residents
IMPROVING FUNCTIONAL ABILITY IN THE ELDERLY VIA THE SPENCER TECHNIQUE, AN OSTEOPATHIC MANIPULATIVE TREATMENT: A RANDOMIZED CONTROLLED TRIAL

- Janice A. Knebel, DO, MBA; Jay H. Shores, PhD; Russell G. Gamber, DO; et. al.

- JAOA July 2002
TREATMENT FREQUENCY

- 29 Patients, Treatment and control (placebo)
  - both received range of motion.
  - Tx group received muscle energy also
- Twice during each session
- Weeks 2, 4, 6 then monthly weeks 10, 14
TREATMENT PROTOCOL

- Extension
- Flexion
- Compression circumduction
- Circumduction with traction
- Adduction
- Internal rotation
- Stretching
FINDINGS

- All patients improved, both placebo and treatment.
NBOME

- Item Writers
- Exam Reviewers