

Osteopathic Pain Management

ADRIENNE KANIA, DO, FAAO

JUNE 26, 2021

Learning Objectives

1. Demonstrate an understanding of osteopathic medicine, including its philosophy and application.
2. Be able to identify examples of the four tenets of osteopathic medicine.
3. Recognize the 5 Models of Osteopathic Care.
4. Review recent literature that demonstrates efficacy of osteopathic care for pain management.

Terminology- Words that Matter

OPP- Osteopathic Principles and Practices

- The contextual framework used to deliver patient care (**4 tenets**)

OMM- Osteopathic Manipulative Medicine

- System of diagnosis and manipulative treatment of somatic dysfunction

OMT- Osteopathic Manipulative Treatment (**5 models**)

- “The application of manually guided forces by an osteopathic physician to improve physiologic function and/or support homeostasis that has been altered by somatic dysfunction.”
- application of single/multiple osteopathic techniques as treatment

Terminology- Words that Matter

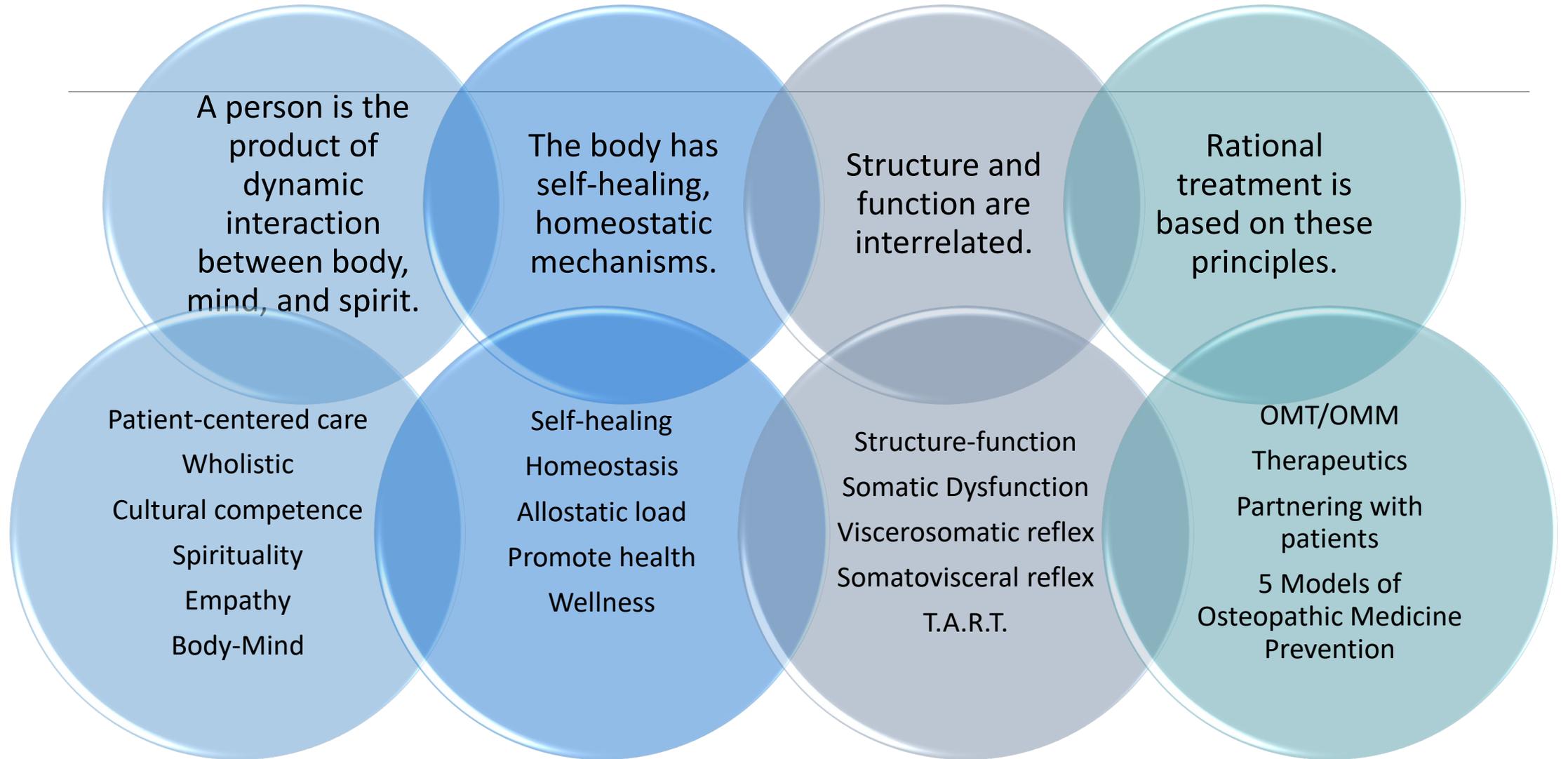
SD- Somatic Dysfunction

- “Impaired or altered function of related components of the **somatic** (bodywork) system including: the skeletal, arthrodiar, and myofascial structures, and their related vascular, lymphatic, and neural elements.”
- Diagnosed by palpation, treated with OMT.

Osteopathic Manipulative Treatment = OMT, delivered by and osteopathic physician

Osteopathic Manipulative Therapy = OMTh, delivered by an osteopathic practitioner

Four Tenets of Osteopathic Medicine



Rationale for OMT

- ❖ Areas of somatic dysfunction indicate that the body (and therefore the whole person) has moved from a state of health, balance or homeostasis to a state of allostasis or stress.
- ❖ The body is exhibiting signs and symptoms of inflammation, autonomic nervous system imbalance and other physiologic imbalances.
- ❖ By diagnosing somatic dysfunction (using the TART criteria), then performing OMT to correct the somatic dysfunction, we attempt to return the body to normal and optimize physiology.

Osteopathic Five Models in the Context of the Three Domains of a Philosophy of Medicine

Models	Health	Disease	Patient Care*
Biomechanical	Efficient and effective posture and motion throughout the musculoskeletal system	Somatic dysfunction; inefficient posture; joint motion restrictions or hyper mobility; instability	Alleviate somatic dysfunction utilizing the osteopathic palpatory diagnosis and OMT to restore normal motion and function throughout the body
Respiratory-Circulatory	Efficient and effective arterial supply, venous and lymphatic drainage to and from all cells; effective respiration	Vascular compromise, edema, tissue congestion' poor gas exchange	Remove mechanical impediments to respiration and circulation and relieve congestion and edema by improving venous and lymphatic drainage
Neurological	Efficient and effective sensory processing, neural integration and control, autonomic balance, central and peripheral nervous functions	Abnormal sensation, imbalance of autonomic functions, central and peripheral sensitization/malfunction; pain syndromes	Restore normal sensation, neurological processes and control; alleviate pain
Metabolic-Energy	Efficient and effective cellular metabolic processes, energy expenditure and exchange, endocrine and immune regulation and control	Energy loss, fatigue, ineffective metabolic processes, toxic waste buildup, inflammation, infection, poor wound healing, poor nutrition; adverse response to medication; loss of endocrine control of vital functions	Restore efficient metabolic processes and bioenergetics, alleviate inflammation, infection, restore healing and repair functions and endocrine control
Behavioral	Efficient and effective mental, emotional and spiritual functions, healthy lifestyle choices and activities, good social support system	Ineffective function due to drug abuse, environmental chemical exposure or trauma, poor lifestyle choices (i.e., inactivity, dietary indiscretions); inability to adapt to stress or environmental challenges	Assess and treat the whole person – physical, psychological, social, cultural, behavioral and spiritual aspects; collaborative partnership; individualized patient care and self-responsibility for healthy lifestyle choices

*Utilizing combinations of Osteopathic manipulative medicine, medications, surgery, and education as appropriate.

Chronic Pain

AOA Guidelines for OMT for Patients with Low Back Pain

Meta-Analysis of Randomized Control Trials (Nov 2010)

- **OMT significantly reduced low back pain**
- Subgroup analysis showed significant pain reduction in patients who received OMT vs active treatment or placebo/no treatment
- Pain reduction with OMT and OMTh
- Pain reduction observed during short,- intermediate-, and long-term follow-up

OMT for treatment of SD has not shown harm in any trial

AOA Guidelines for OMT for Patients with Low Back Pain - 2016 Update

Another meta-analysis since the original one done in 2010

- OMT significantly reduces pain in patients with LBP
- Improves functional status in patients with LBP
- Found to be true in pregnant and postpartum women
- Helps in acute and chronic nonspecific LBP

Osteopathic Care w/ & w/o OMT in Patients with Chronic LBP

Retrospective, observational, community-based study of 445 patients with chronic LBP

Used Numerical Rating Scale and Roland-Morris Disability Questionnaire and tracked medication use

288 patients used NSAIDs (64.7%)

127 patients used opioids (36.9%)

91 patients used NSAIDs and opioids (20.4%)

DOs treated 127 patients (28.5%), 79 of them received OMT for their LBP

Osteopathic Care w/ & w/o OMT in Patients with Chronic LBP

No standardized regimen for the OMT

Patients treated with OMT were less likely to use NSAIDs or opioids

DO patients who did not receive OMT did not fare any better than those treated by MDs

OMT for Patients with LBP w/ and w/o Pain Medication

Subjects had LBP for a minimum of 6 months

Two groups, 10 subjects in each:

- OMT-only, saw physicians at intervals deemed appropriate for them, treatment tailored for patient
- OMT + medication, received medication and were on it for three months to allow for titration of medications before instituting OMT; if improved while receiving OMT, then Rx titrated downward

OMT for Patients with LBP w/ and w/o Pain Medication

10 different resident physicians, sometimes the same doctor, sometimes different

OMT techniques used were Counterstrain, Muscle energy, myofascial release, High velocity low amplitude (HVLA)

Both groups showed a significant decrease in overall pain

OMT for Patients with LBP w/ and w/o Pain Medication

Both groups showed a decrease in pain

Both groups showed an increase in function based on Oswestry Disability Index of 18%

No significant improvement in the 3 months that patients were on meds w/o OMT

Only 2/10 were using cyclobenzaprine at the end of the study

Only 1/10 was using an opiate, but not statistically significant

OMT and Work Status

Observational study of 1013 records from 27 family medicine residencies

- 474 records excluded due to comorbid disease or loss of reflexes

Of the 539 records analyzed

- ADLs limited in 42%
- Previous history of LBP in 66%
- PE:
 - No sensory or proprioceptive deficits 88%
 - Motor function normal in 74.5%
 - Normal ankle and knee reflexes in 91%

Patients treated with OMT had reduced use of Rxs and reduced missed workdays or restricted workdays

OMT for Return to Work in Patients with Chronic LBP

Meta-analysis of 16 Randomized Controlled Trials (RCT)

OMT vs Standard Care showed significant reduction in pain

OMT vs Standard Care showed significant improvement in QOL

OMTh + Exercise vs Exercise only showed significant reduction in pain

OMTh vs Standard Care did not show a significant improvement in RTW at 12 weeks, although it did at 8 weeks after OMTh

OMT in Rural Patients

455 patients with chronic, non-malignant, low back pain

Enrolled from 2001-2011 from a rural safety-net hospital in northern TX

Findings:

Patients with stable chronic pain do not begin to improve without treatment

Single physician using multiple techniques (MFR, MET, Counterstrain, Cranial, Visceral)

Noted an increase in functional status per Oswestry Disability Index

How Does OMT Work? A Look at Biomarkers

Prospective blinded assessment

10 subjects with chronic LBP

10 subjects without chronic LBP

Studied for 5 consecutive days with blood drawn at the same time each day

OMT administered to subjects with chronic LBP on Day 4

Daily questionnaires used to assess pain and stress levels, sleep patterns, and substance use

Blood analyzed for multiple biomarkers

Biomarkers

Beta-endorphins

Serotonin (5-hydroxytryptamine, 5-HT)

5-hydroxyindoleacetic acid (5-HIAA)

Anandamide (arachidonylethanolamide, AEA)

N-palmitoylethanolamide (PEA)

Definitions

Beta-endorphins – an endogenous opioid which regulate inflammation via opioid receptors found on immune cells at the site(s) of inflammation.

Serotonin/5-HT/5-HIAA – major neurotransmitter of the immune system and a potent stimulant for nociceptive nerve endings. Found in platelets and basophils and at higher concentrations in blood products of folks with chronic inflammatory conditions, such as rheumatoid arthritis and fibromyalgia.

Definitions

Endocannabinoids and Anandamide/AEA – act through receptors in the periphery, spinal and central pathways to produce analgesia, and play a role in mediating inflammatory pain. AEA has been shown to have a strong analgesic and anti-inflammatory properties in animal studies.

N-palmitoylethanolamide (PEA) – is not an endocannabinoid, but also has strong analgesic and anti-inflammatory properties.

Methods

Blood was sampled on all 5 study days at the same time

OMT administered to all subjects on Day 4 by 1 physician

OMT techniques included articulatory, muscle energy, soft tissue, Counterstrain

HVLA was not used as it wasn't possible to determine if it would be appropriate for all subjects

After 30 minutes rest post-treatment, blood was sampled on Day 4

Pain scales, stress scales, hours of sleep, use of alcohol, anticonvulsants, NSAIDs, steroids, pain medications, stimulants and caffeinated beverages were recorded daily.

Results Overall

Beta-endorphin increased 19% in 19/20 subjects 30 minutes after OMT, and 11% at 24 hours post-OMT.

Serotonin/5-HT levels did not change with OMT in either group on Days 1-4, but dropped 37% 24 hours post-OMT in the chronic LBP group.

5-HIAA levels did not change with OMT in either group on Days 1-3, but dropped 13% 30 minutes post-OMT

AEA decreased in 19/20 subjects 30 minutes and 24 hours post-OMT by 17%

PEA increased in 19/20 subjects 30 minutes post-OMT, 51% for those with chronic LBP and 12% for those without LBP

Results in subjects with chronic LBP

Perceived pain did not correlate with changes in beta-endorphins, 5-HT, AEA or PEA at 30 minutes or 24 hours post-OMT

Stress levels significantly decreased 24 hours post-OMT

Increased NSAID use was noted on Day 4 after OMT

No changes in sleep patterns or confounding substance use noted during the study

Effects of OMT may be mediated by endogenous opioid and endocannabinoid pathways, not by serotonin pathways.

Acute Pain

Pre-operative OMT in TKA

Comparative, non-randomized study of 70 patients scheduled for total knee arthroplasty

OMTh group (35 subjects) received 2 sessions of treatment at 3 and 1 week prior to surgery

Standard of care group also had 35 subjects

OMTh group had less pain at rest and with walking at 1-month post-op and used less analgesics during the first week

No difference between analgesic use for weeks 2-4 in either group

No statistical difference at 6-months or 12-months post-op

OMT vs IM Ketorolac in the ED for Acute Neck Pain

RCT in 58 subjects presenting with acute neck pain (<3 weeks duration) to an Emergency Department

Extensive exclusion criteria

OMT vs Ketorolac IM

3 osteopathic ER-specialists who practice OMT (HVLA, muscle energy, soft tissue)

OMT applied by ER doctor who enrolled the patient

OMT group had statistically significant decrease in pain intensity 1-hour post-OMT

Barriers to the Application of OMT

Poor re-imburement other than Medicare

Time constraints

Lack of confidence in one's skills

Loss of skill over time due to disuse

Inadequate office space

Limited by practice management

We Are Self-Healing, Self-Regulating

Structure and function are reciprocal. OMT improves function and structure.

Incorporating the 5 Models makes the patient feel heard and touched at every level.

The more your evaluation is multifactorial and includes the biopsychosocial elements, reflecting in a comprehensive patient-tailored treatment plan, the greater the decrease in the patient's pain scores and better QOL.

*A collaborative doctor-patient relationship allows the physician to participate in the patient's healing process and allows the doctor to heal themselves.

Citations

1. “American Osteopathic Association Guidelines for Osteopathic Manipulative Treatment (OMT) for Patients with Low Back Pain,” JAOA, 2010, Nov 1;110(11):653-666
2. “American Osteopathic Association Guidelines for Osteopathic Manipulative Treatment (OMT) for Patients with Low Back Pain,” JAOA, 2016, Aug 1;116(8):536-49
3. “Osteopathic Medical Care With and Without Osteopathic Manipulative Treatment in Patients with Chronic Low Back Pain: A Pain Registry-Based Study,” JAOA, 2020, Feb 1;120(2):64-73
4. “Use of osteopathic manipulative treatment for low back pain patients with and without medications history,” Stephanie Montrose*, MS, DO, Mark Vogel, PhD and Kimberly R. Barber, PhD J Osteopath Med 2021; 121(1): 63–69
5. “OMT Associated With Reduced Analgesic Prescribing and Fewer Missed Work Days in Patients With Low Back Pain: An Observational Study,” Prinsen J, Hensel K, Snow R, JAOA, 2014, Feb;114(2):90-98
6. Foundations for Osteopathic Medicine, 4th edition, M Seffinger, ed., Wolters Kluwer, 2018, “Chronic Pain Management”

Citations

7. “Osteopathic Manual Treatment for Pain Severity, Functional Improvement, and Return to Work in Patients with Chronic Pain,” Rehman Y, Ferguson H, Bozek A, Blair J, Allison A, Johnston R, JAOA, 2020; Dec 120(12):888-906
8. “Osteopathic Manipulation Improves Functional Status in Patients with Non-Specific Chronic Back Pain in a Rural Outpatient Setting,” Wilson D, Gorham J, Lamb T, Lui S, Daniel T, The AAO Journal, 2018; Jun28(2):29-33
9. “Role of Osteopathic Manipulative Treatment in Altering Pain Biomarkers: A Pilot Study,” Degenhardt B, Darmani N, Johnson J, Towns L, Rhodes D, Trinh C, McClanahan B, DiMarzo V, JAOA, 2007; Sep 107(9):387-400
10. “Preoperative Osteopathic Manipulative Therapy Improves Postoperative Pain and Reduces Opioid Consumption After Total Knee Arthroplasty: A Prospective Study,” Barral P, Klouche S, Barral N, Lemoulec YP, Thes A, Bauer T, JAOA, 2020; Jul 120(7):436-445
11. “Intramuscular Ketorolac Versus Osteopathic Manipulative Treatment in the Management of Acute Neck Pain in the Emergency Department: A Randomized Clinical Trial;,” McReynolds T, Sheridan B, JAOA, 2005; Feb 105(2):57-68
12. “Two manual therapy techniques for management of lumbar radiculopathy: a randomized clinical trial,” Musa S. Danazumi*, PT, MSc, Bashir Bello, PT, PhD, Abdulsalam M. Yakasai, PT, PhD, and Bashir Kaka, PT, PhD, J Osteopath Med 2021; 121(4): 391–400