



OSTEOPATHIC PHYSIATRIC APPROACH TO PAIN CARE

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STAAB SYMPOSIUM

DISCLOSURES

- I have no financial disclosures
- I serve on the American Osteopathic Association Board of Trustees (BOT)
- I serve on the National Board of Osteopathic Medical Examiners Board of Directors (BOD)

LEARNING OBJECTIVES

- Define pain and how the body perceives and processes pain
 - Understanding this helps the patient feel understood which helps in the rehabilitation process
- Discuss the integration of PM&R and Osteopathic Principles and Practice
- Discuss how Osteopathy and Physical Medicine and Rehabilitation (PM&R) can influence the body to better handle pain
 - By enhancing the patient's own ability to heal
- Review some of the current research supporting use of Osteopathic Manipulative Treatment (OMT) in pain conditions

DEFINE PAIN

- International Association for the Study of Pain (IASP) definition:
- “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.”
- Pain is always a personal experience that is influenced to varying degrees by biological, psychological and social factors.
- Pain is a cultural experience

NOCICEPTION VS. PAIN

- Nociception is the process of encoding noxious stimuli
 - Leads to pain perception
 - Involves the DETECTION of potentially injurious stimuli by nociceptors
 - Signals are transmitted to the brain via the spinal cord
 - Produce unpleasant sensory and emotional experience = Perception of pain
- Pain is a PERCEPTION
- Nociception usually produces pain
 - Pain can occur without nociception
 - Central neuropathic pain after stroke
 - Nociception may not lead to pain
 - General anesthesia

TYPES OF PAIN

- **NOCICEPTIVE:** Pain that arises from actual damage to a non-neural tissue and is due to the activation of nociceptors
 - Fracture, burn
- **NEUROPATHIC:** Pain caused by a lesion or disease of the somatosensory nervous system
 - Diabetic neuropathy, shingles, cancer
- **NOCIOPLASTIC:** Pain arising from altered nociception – specifically, changed function of pain-related sensory pathways – despite no clear evidence of actual or threatened tissue damage causing the pain, or evidence for disease/lesion of the somatosensory system causing the pain.
 - Pain central sensitization

CENTRAL SENSITIZATION

- It IS in their head!
 - But they are not “making it up”
- CNS becomes hyper-responsive amplifying pain and sensory signals beyond normal levels
 - Brain and spinal cord undergo changes that increase responsiveness to pain and touch
 - Results from repeated or persistent peripheral stimuli such as injury or inflammation
 - Triggers neuroplastic changes in the CNS
 - Increase excitability of neurons

CENTRAL SENSITIZATION

- Allodynia: Pain in response to normally non painful stimuli
- Hyperalgesia: Exaggerated pain response to stimuli that are normally painful
- Sensory Hypersensitivity: Increased sensitivity to light, sound, odors, people
- Cognitive and emotional effects: Poor concentration, short term memory deficits, anxiety, emotional distress
- Pain/Sick role behaviors: Increased rest, malaise and observable pain behaviors
- Symptoms extend beyond the original site of injury



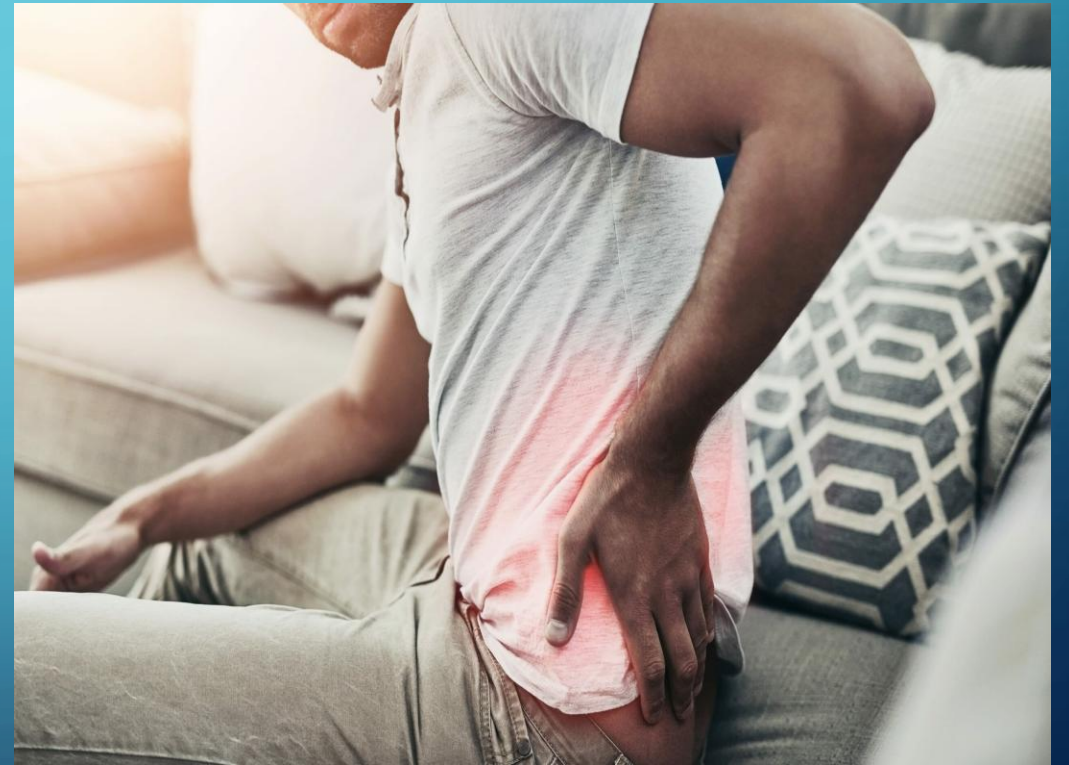
PAIN PATHWAYS

- TRANSDUCTION
 - TRANSMISSION
 - MODULATION
 - PERCEPTION
- 



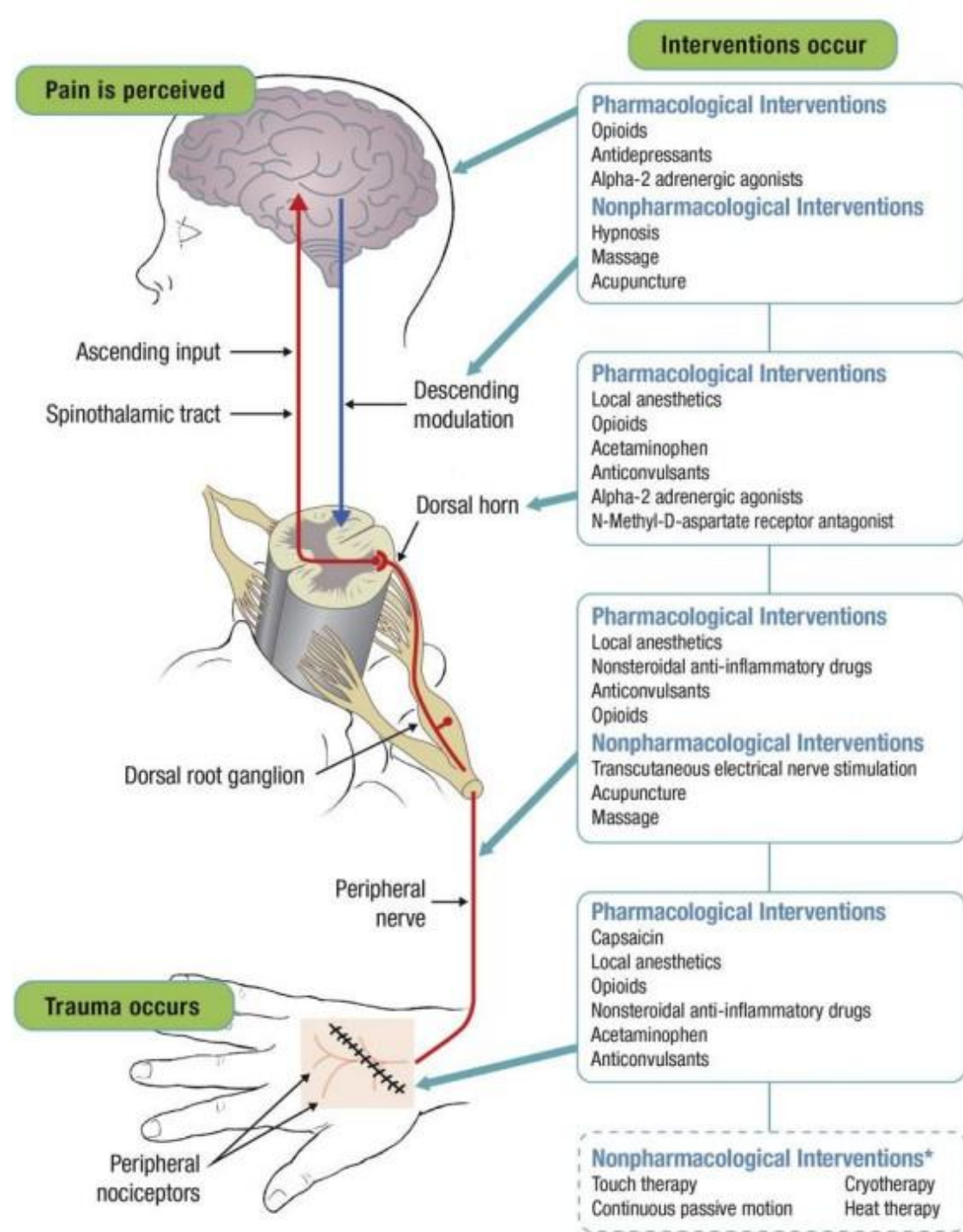
TRANSDUCTION

- DETECTION of pain
- Patients often times describe the activity or event where pain first started/was noticed



TRANSMISSION

- Pain Processing
- Pain pathways
- Why muscle relaxants and SSRIs can help with pain



MODULATION

- REDUCTION OR INCREASE
 - Influences pain perception
- NOCEBO:
 - A detrimental effect on health produced by psychological or psychosomatic factors such as negative expectations of treatment or prognosis
- PLACEBO:
 - Something with no therapeutic effect but can influence a patient's perception of symptoms in a positive way

PERCEPTION

- INTERPRETATION of pain
- Personal experience that influenced by factors
 - Learned concept through life experiences
- Perception guides behaviors
 - Three principles:
 - Thoughts create feelings
 - Feelings create behaviors

PERCEPTION IS KEY

- Thoughts affect the way pain is perceived
 - They think they're weak
 - Show them they are strong on exam
 - Show them the MRI shows that there is nothing that can kill or paralyze them
- Help change their thoughts
- Change their perception about their pain
- Change their behavior and help them buy into rehabilitation

OSTEOPATHIC PRINCIPLES IN PRACTICE

- The body is a unit of **BODY, MIND, and SPIRIT**
- The body is capable of self regulation and self healing
- Structure and function are interrelated
- Rational treatment is based on the above principles

PRACTICING OSTEOPATHICALLY

- How do you define it?
- AOA:
 - A whole-person approach to healthcare, treating the patient as an interconnected system of body, mind, and spirit. Based on principles that structure and function are interrelated, the body is capable of self healing and that rational treatment is based on these principles.
- What makes us unique?

PRACTICING OSTEOPATHIC MEDICINE

ALLOPATHIC

- Determine a **MEDICAL DIAGNOSIS**
- Utilize evidence-based medicine to determine the best medication, treatment, or surgery (within their specialty/training) for that diagnosis
- Follow-up to see if there is improvement

OSTEOPATHIC

- Determine a **MEDICAL DIAGNOSIS**
- Utilize evidence based medicine for medical or surgical treatment
- **Acknowledge that there is a somatic dysfunction associated with that diagnosis – either causing it or contributing to it**
- **Either using their own hands to diagnose and treat these somatic dysfunctions or referring to a DO**
- Follow-up to see if there is improvement

INTEGRATION

• PHYSIATRY

- Restore functional ability
- Maximum Independence
- Quality of Life/Participation
- Whole person care
 - Physical, emotional, social, vocational needs
- Comprehensive treatment plans

• OPP

- Structure and Function are interrelated
 - OMT
- Holistic Care
 - Body Mind and Spirit
- Whole person care
 - Physical, emotional, social needs
- Prevention

PHYSIATRIC CARE AND OPP

- Pain Management
- Strength
- Sensation
- Circulation
- Congestion/Swelling
 - Arterial/Venous flow
 - Lymphatic flow

GENERAL PM&R PAIN TREATMENT CONCEPTS

- **OSTEOPATHIC MANIPULATIVE TREATMENT**
- **EXERCISE PRESCRIPTION** (graded exposure, motor control, strength endurance)
- Education (Pain neuroscience education, pacing, sleep)
- Behavioral Strategies (Cognitive Behavioral Therapy (CBT)-informed, mindfulness, stress regulation)
- Modalities/interventions (medications, injections)

THE PHYSIATRIC DIFFERENCE

- Rehabilitate an injury causing pain
 - Try to prevent the pain from becoming chronic
- **TREAT THE CAUSE, NOT JUST THE SYMPTOMS**
 - Specific approach

REHABILITATION CONCEPTS

- Proprioception
- Muscle Imbalance
- Reciprocal Inhibition
- Muscle Firing Pattern

PROPRIOCEPTION

- Internal sense of POSITION, MOVEMENT, and FORCE/LOAD
- Allows individuals to know where their limbs are in space
- Allows judgement of strength needed to lift objects
- Allows individuals to maintain balance
- CRUCIAL for body AWARENESS
- Plays a significant role in physical coordination and movement.

MUSCLE IMBALANCE

- When opposing muscles differ in strength or flexibility
- Potentially affects joint health
- Examples:
 - Quadriceps dominance/Weaker Hamstrings
 - Association Anterior Cruciate Ligament tears
- Created by compensation patterns
 - Limping
 - Posture Offloading
 - Compensatory mechanics

RECIPROCAL INHIBITION

- Neuromuscular process where the contraction of one muscle (agonist) leads to the relaxation of its opposing muscle (antagonist)
 - Facilitates smooth, efficient, and coordinated movement of the joint
 - Prevents muscle strain or tears
 - Involved in reflex actions like removing hand from a hot surface

MUSCLE FIRING PATTERN

- The sequence and coordination of muscle activation during movement
 - Crucial for effective, efficient physical performance – smooth and coordinated movements
 - Improves force production
- Abnormal firing patterns can lead to compensatory patterns
 - Increases risk of injury and joint pain

LOWER CROSSED SYNDROME

- Certain muscle groups have increased activity and perceived tightness
 - Iliopsoas, Tensor Fascia Lata, Lumbar extensors, Erector Spinae, and Quadratus Lumborum, and Hamstrings
- Other muscle groups have decreased activity and weakness
 - Deep Abdominal Muscles, Transversus Abdominus, Gluteus Maximus and Gluteus Medius.
- Theorized to cause observable postural changes
 - Anterior pelvic tilt, increased lumbar lordosis and compensatory adjustments in adjacent regions



UPPER CROSSED SYNDROME

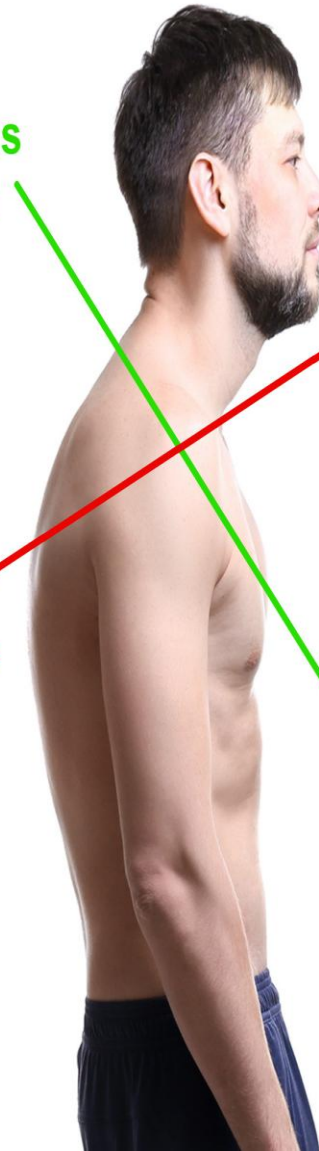
- Increased activity and tightness
 - Upper Trapezius, Levator Scapulae, Sternocleidomastoid,
 - Pectoralis Major and Minor, Suboccipital
- Increased weakness
 - Deep neck flexors, Serratus Anterior, Rhomboids, Mid and Lower Trapezius
- Theorized to cause:
 - Forward head posture, increased cervical lordosis, elevated and protracted shoulders, scapular winging or dyskinesis
 - Cause stress in the spine

Tight upper trapezius and levator scapula

Inhibited neck flexion

Inactive middle and lower trapezius

Tight pectoralis major and minor



OSTEOPATHIC REHABILITATION PROGRAM ELEMENTS

- OMT – decrease pain, restore normal proprioception
- Balance improve proprioception
- Stretching/Flexibility to help allow normal firing patterns
- Strengthening to help correct muscle imbalance
- Aerobic Training

OSTEOPATHIC SOMATIC DYSFUNCTIONS (SD)

- Tight muscle vs. a short muscle
- The body is trying to protect the muscle
 - Osteopathic SD (strain/counterstrain tender point, trigger band, herniated trigger point, myofascial trigger point, ligament capsule tightness)
 - If this is not treated, you can stretch all day, and the muscle will not lengthen
 - Treat the somatic dysfunction and the muscle will stay long
- Treating the SDs alone may relieve chronic pain
- Patients may need PT but it works 1000% better when OMT is done first or in conjunction
- Exercises and stretches do NOT work well without treating the osteopathic SDs! This is why so many PT schools teach manipulation

OSTEOPATHIC MANIPULATIVE TREATMENT

- In general, OMT should never hurt
 - Muscle energy
 - HVLA- high velocity/low amplitude
 - Counter Strain (CS)
 - Myofascial Release (MFR)
 - Cranial
 - Soft Tissue
 - Etc.
- Exception: Fascial Distortion Model (FDM)
- Communicate with the patient

BALANCE TRAINING TO IMPROVE PROPRIOCEPTION

- Balance is maintained through muscle contractions and relaxations to maintain posture through an interaction of the motor and sensory systems
 - Vestibular
 - Visual
 - Mechanoreceptors/proprioceptors in joints and muscles
 - All coordinated by the CEREBELLUM
 - i.e., the CEREBELLUM helps to coordinate the movements created through the integration of these sensory inputs.

RESTORING BALANCE

- Stand on one leg with arms out
- Stand on one leg with arms in
- Stand on one leg with eyes closed
- Tandem walking
- Walking on a low beam
- Standing on an ankle board

STRETCHING/FLEXIBILITY

- Stretching should be done AFTER proprioception training has started
- Now the body knows where the joint should be in space
- A muscle was kept tight to protect joints that were injured in some way.
 - If this is chronic, it becomes a learned behavior, which includes changing proprioception. This perpetuates injury and pain.
- The same sequence of muscle contractions (“firing pattern”) that got created to protect the injury is now the same pattern that is PERPETUATING the pain now

STRETCHING/FLEXIBILITY

- Diagnose asymmetric tightness and weakness
- Manual stretches
 - Treat the tight antagonist
 - Sometimes stretching is not addressing the root cause
 - Osteopathic somatic dysfunction of the muscle
 - Muscle remains tight because of abnormal firing patterns
- Once muscles can stretch, now muscles can be strengthened properly.
 - If you strengthen before stretching, you only make a tight muscle tighter

STRENGTHENING

- Look for asymmetry in strength
- Pseudoparesis
 - Muscle acts like it is weak
- Typically, due to the antagonist muscle being tight
 - Reciprocal inhibition
 - Tight hip flexors do not allow the gluteus maximus to optimally work/be strengthened

STRENGTHENING

- If you strengthen too early (without training proprioception and stretching), you are compensating with muscles that are already short and tight
 - You are reinforcing bad firing patterns
- Always start with proprioception and stretching first
- Strengthen if needed and only once the patient can handle the load
 - If they strengthen with a light load and they hurt – they cannot handle the load or they are doing the exercise wrong, or they need more stretching, or something else needs to be treated.
 - Strengthening should not hurt. EXCEPTION is eccentric loading for tendinosis.

AEROBIC TRAINING

- Only start once patient can handle the load
- 3 minutes of walking
- Gradually increase
- Goal is 30 minutes per day
 - Does not have to be continuous!
- Swimming or water walking are great
- Running with a heel strike is discouraged
 - Jarring-reactive to the nervous system

PUTTING IT TOGETHER

- Bad proprioception happens when you are guarding for so long you learn how to do faulty movements
- OMT is treating proprioception!
- Wrong firing patterns and muscle imbalances occur
 - No amount of stretching or strengthening will help
- Restore Proprioception starting through the feet
- Allows the body the ability to have normal firing patterns of muscles with activities
 - “Firing patterns” are the SEQUENCES of muscle contractions and relaxations in normal movements

CASE STUDY #1

- 75-year-old man with past medical history significant for Hypertension and Type II Diabetes with Chronic Kidney Disease with chief complaint of “I threw my back out.” Patient was shoveling snow earlier in the day when pain developed
- Pain is just axial. Review of Systems is negative.
- Asking for a Medrol dose pack or a muscle relaxer to help with pain.
- Physical Exam: Patient cannot stand up straight. Stands with flexion at the hips. Weakness of right hip flexor but has significant pain. Otherwise, normal strength, reflexes and sensation

OMT

- Osteopathic structural exam: Tight right iliopsoas
- Pain with manual stretching of the right iliopsoas
- Osteopathic structural exam: Right iliopsoas tender point
- Osteopathic structural exam: Hypertonic right hamstring

OMT

- Treat iliopsoas tender point
- Stretch the hamstring
- Patient able to stand up straight
- Patient reports 75% improvement in pain

CASE STUDY #2



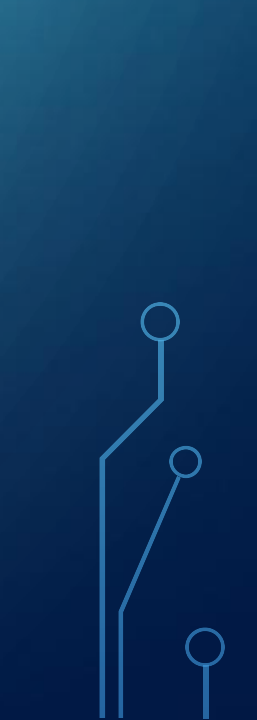
- 65-year-old woman with past medical history significant for depression and osteopenia presents with chief complaint of right lateral hip pain of 6 months duration.
- Pain does not radiate. No numbness/tingling. She is unable to play pickle ball due to pain. She can't sleep on her right side. Review of Systems is negative.
- She has done physical therapy and had a cortisone injection that worked great for 4 weeks. She is inquiring about a repeat corticosteroid injection.
- Physical Examination: 4/5 strength for the right hip abductors but otherwise normal strength, reflexes and sensation. Tenderness over the right greater trochanter.

OMT/OPP

- Right adductor strain/counterstrain tender point
- Treat with strain/counterstrain
- Recheck strength
 - Now has 5/5 strength for the right hip abductors
 - Reciprocal inhibition did not allow hip abductor to work properly
 - This is why PT “did not work”
- Tell patient not to stretch adductors for 3 days
- Then resume strengthening and stretching program from PT
- Patient able to avoid corticosteroid injection



REMEMBER

- The site of the pain is not always the source of the pain.
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CASE STUDY #3

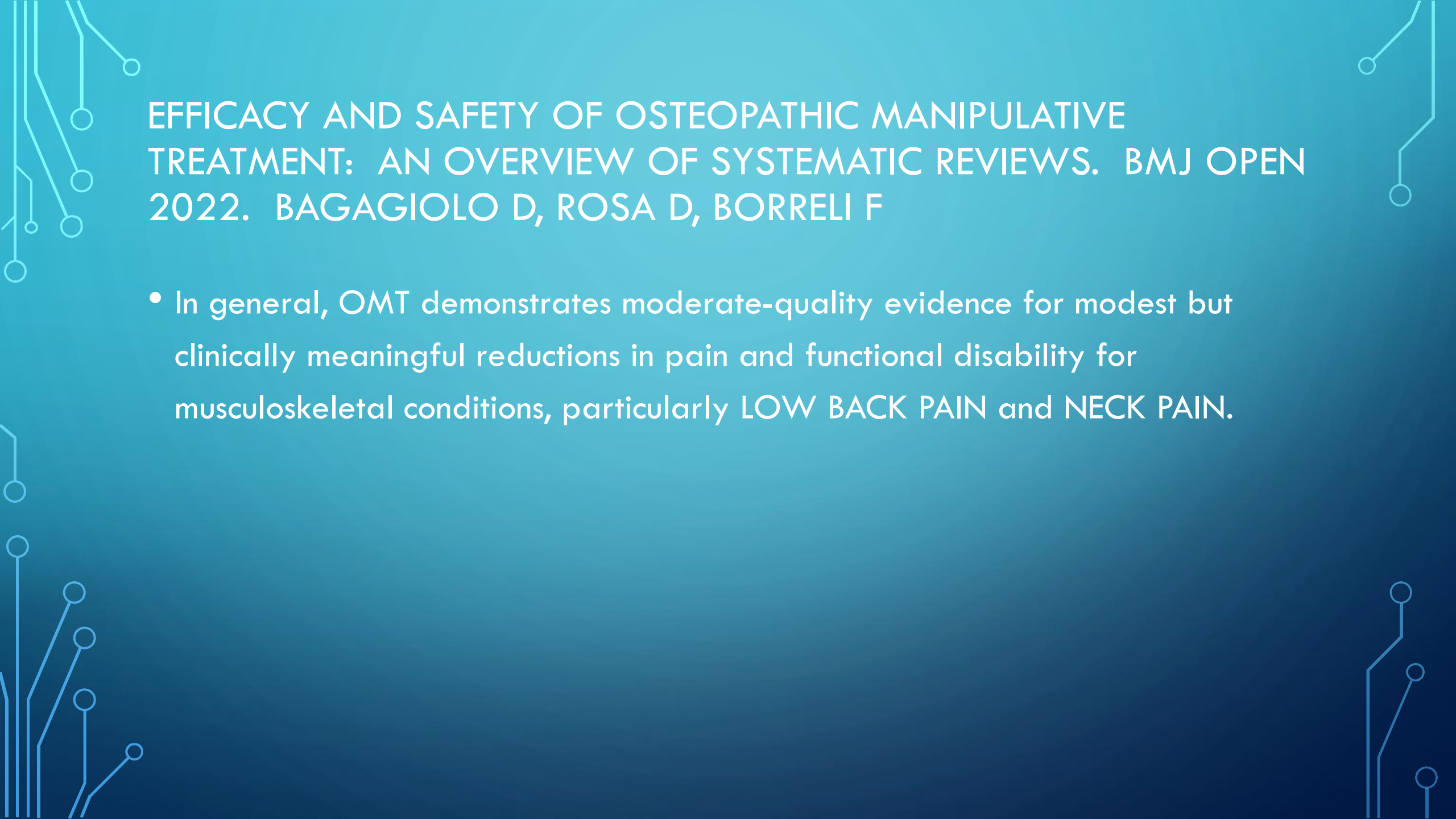
- 75-year-old woman with history of stroke with deconditioning and residual weakness. Chief complaint is decreased functioning, having significant difficulty with sit to stand transfers.
- No significant pain. No significant review of systems.
- Physical exam shows 4/5 strength for the hip extensors and knee extensors. Patient believes she is weak and must use her hands to push herself up. On attempting to transfer:
 - Chest did not go towards her knees (hip hinge)
 - Ankles had limited dorsiflexion
 - Could not transfer her center of gravity forward enough for her weakened gluts and quads to get her standing.

OMT

- Quickly teach hip hinge
- Treat anterior tibia on the talus
- Increased dorsiflexion
- Allowed center of gravity to move forward
 - Mechanical advantage
- Patient could stand up without her hands
- TEARS OF JOY!



EVIDENCE



EFFICACY AND SAFETY OF OSTEOPATHIC MANIPULATIVE TREATMENT: AN OVERVIEW OF SYSTEMATIC REVIEWS. BMJ OPEN 2022. BAGAGIOLO D, ROSA D, BORRELI F

- In general, OMT demonstrates moderate-quality evidence for modest but clinically meaningful reductions in pain and functional disability for musculoskeletal conditions, particularly LOW BACK PAIN and NECK PAIN.

CHRONIC NONSPECIFIC LOW BACK PAIN

- Multiple systematic reviews and meta-analyses show consistent benefits
- OMT produces significant reductions in:
 - Pain
 - Functional Status improvements
 - OMT performs as effectively as other recommended treatments like exercise and NSAIDs.
- AOA Guidelines and Department of Veterans Affairs/Department of Defense guidelines note that OMT/spinal manipulation results in modest but clinically important reductions in pain and disability

CHRONIC NONSPECIFIC LOW BACK PAIN

- 2021 JAMA Internal Medicine Trial found only small effects on activity limitations when comparing OMT to sham treatment with questionable clinical relevance
 - Treatments performed by non physicians
- Specific techniques did produce clinically relevant improvements compared to sham interventions

THE EFFECTS OF OSTEOPATHIC MANIPULATIVE TREATMENT ON PAIN AND DISABILITY IN PATIENTS WITH CHRONIC NECK PAIN: A SINGLE-BLINDED RANDOMIZED CONTROLLED TRIAL. PM&R: THE JOURNAL OF INJURY, FUNCTION, AND REHABILITATION. 2022. CHOLEWICKI J, POPOVICH JM, REEVES NP, ET AL.

- Single-blinded randomized controlled trial demonstrated significant improvements with OMT over 4-6 weeks
- Reductions in:
 - Average pain
 - Current pain
 - Disability

EVIDENCE QUALITY AND LIMITATIONS

- Most systematic reviews are rated as low to critically low methodological quality.
- Small sample sizes
- Heterogenous interventions
- Variable comparison groups
- Geographic differences
 - European studies generally show more favorable results than US studies

MY TAKE

- It is hard to do quality studies on OMT
 - Randomized controlled
 - Double blinded
 - Every patient has unique somatic dysfunctions
- It works!
- It's safe!

SUMMARY

- Pain is more than a sensation.
- Change patient perception to create buy in for rehabilitation
- Osteopathic Manipulative Treatment is key
 - Treat somatic dysfunctions that prevent progressing in the rehab process
 - Show them they can have pain relief, it gives them hope!
- Restore normal proprioception to allow stretching which will then allow strengthening with normal firing patterns.

The background is a solid teal color with a subtle gradient. In the corners, there are decorative white line-art patterns resembling circuit boards or neural networks, with lines and small circles connecting them.

THANK YOU!

- Jenny Kendall, DO
- jkendalldo@gmail.com

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