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Introduction to OMM for MDs and DOs

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

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FIRST IN WHOLE PERSON HEALTHCARE

MUSCLE ENERGY TECHNIQUE:

THORACIC SPINE

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Topics

- Define Muscle Energy
- Describe the Different Muscle Contractions
- Review Steps of Muscle Energy Technique
- Discuss a Case Presentation
- Demonstrate & Practice Muscle Energy Technique to the Thoracic Spine

Muscle Energy

- A form of osteopathic manipulative diagnosis and treatment in which the patient's muscles are actively used on request, from a precisely controlled position, in a specific direction, and against a distinctly executed physician counterforce
- First described in 1948 by Fred Mitchell, Sr, DO
- Most commonly used as a direct method technique

Muscle Energy Indications & Diagnosis

- Identification of a specific motion restriction is critical
  - Specific joint motion loss
  - Specific muscle hypertonicity

Muscle Energy Relative Contraindications

1. Infection, hematoma, or tear in involved muscle.
2. Fracture or dislocation of involved joint.
3. Rheumatologic conditions causing instability of the cervical spine.
4. Undiagnosed joint swelling of involved joint.
5. Positioning that compromises vasculature.
6. Uncooperative or unresponsive patient

Muscle Contraction

- Contraction: shortening and/or development of tension in muscle
- Concentric contraction: muscle contraction results in approximation of attachments
- Eccentric contraction: lengthening of muscle during contraction

"Three" Common Types of Muscle Contractions Used in Muscle Energy Tech.

1. Isometric contraction
   - Change in the tension of a muscle without approximation of muscle origin and insertion.
   - Operator force equal to patient force.
   - Most common use with MET
2. Isolytic contraction
   - A form of eccentric contraction designed to break adhesions using an operator-induced force to lengthen the muscle.
   - Operator force is greater than the patient force.

"Three" Common Types of Muscle Contractions (cont.)

3. Isotonic contraction
   - A form of concentric contraction in which a constant counter-force is applied.
   - Operator force is less than patient force.

3.5. Isokinetic contraction
   - A form of concentric contraction against resistance in which the angular change of joint motion is at the same rate.
   - Operator force is less than patient force.

- Isotonic & Isokinetic are similar

Isolytic Contraction Muscle Energy

- **Isolytic contraction: Contraction of a muscle against resistance while forcing the muscle to lengthen**
  - **Physician force greater than patient force**
- **Most commonly used for the treatment of fibrotic or chronically shortened myofascial tissues; also used to gap a joint**
- **Patient contraction is away from the restrictive barrier**

Isokinetic Contraction Muscle Energy

- **Isokinetic contraction: a concentric contraction against resistance in which the angular change of the joint motion is at the same rate.**
  - **Physician force less than patient force**
  - **Force of Contraction: Gentle (10-20 lbs)**
- **Reciprocal Inhibition: when a gentle contraction is initiated in the agonist muscle, there is a reflex relaxation of that muscle's antagonistic group. (Sherrington's Law)**
- **Used to lengthen a muscle shortened by cramp or acute spasm**

Isometric Contraction Muscle Energy

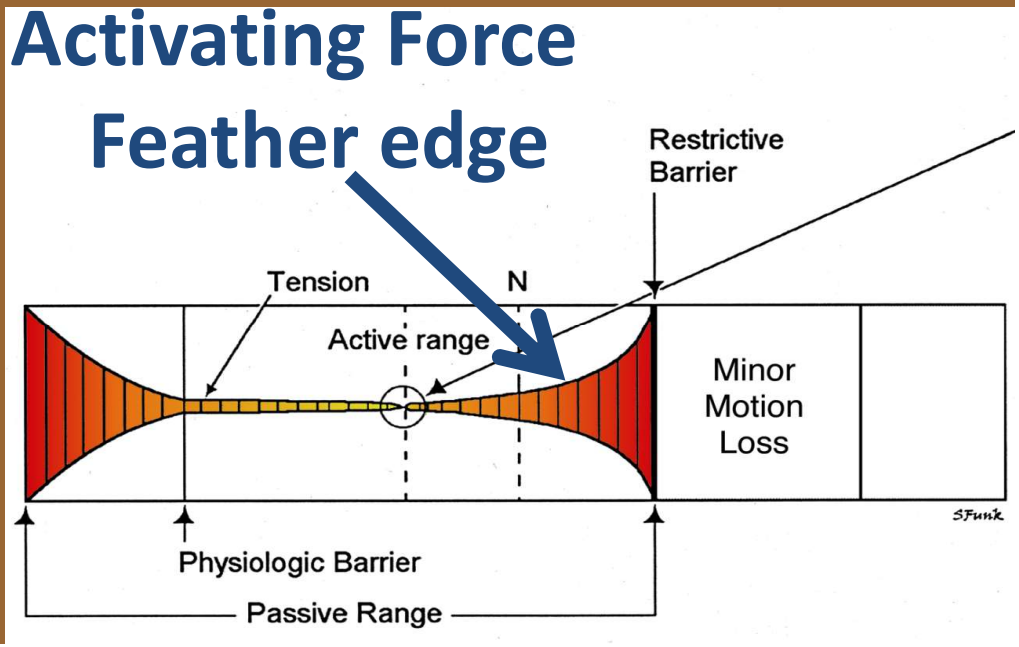
- Most common type of Muscle Energy Technique
- Increase in muscle tension without change in muscle length
  - Physician force equal to patient force
  - Force of Contraction: Sustained gentle pressure (10-20 pounds)
- The origin and insertion of the muscle are maintained in a stationary position while the muscle is contracted against resistance
- Patient contraction generally in a direction away from the restrictive barrier
- Several seconds after the muscle contraction, the physician guides the muscle/joint to the new restrictive barrier

Physiological Basis of Isometric Muscle Energy Technique

- Shortened muscles may reflexively contract when stretched
- Refractory relaxation period occurs after a muscle is contracted
- Technique gently stretches affected structures during the refractory relaxation period to avoid the reflexive contraction

Isometric Muscle Energy example:

1. Pt contracts hamstring away from restrictive barrier
2. After muscle relaxes physician lengthens muscle to new restrictive barrier
3. Repeat until adequate response



Example: Seated – Direct Method – MET: T4-12

Dx: T8 ES_LR_L

Tx position: T8 FS_RR_R

Patient seated w/physician standing behind & to side

1. **Monitor with thumb at posterior TP**
2. **Use hand & axilla to position patient against restrictive barrier**
3. **Perform contract, relax & reposition 3-5 times**
4. ***Recheck***

KM, 103(a), iKM, 163

Steps for Successful Direct (Isometric) Muscle Energy Technique:

1. Accurate specific diagnosis of somatic dysfunction is crucial
2. Position the patient at the point of initial resistance ("feather's edge") of the barrier.
3. Patient instructed in direction, intensity, and duration of muscle contraction.
4. Physician counterforce – equal (for isometric) and opposite to patient muscle contraction.
5. Patient and physician maintain forces for 3-5 seconds.

Steps for Successful Direct (isometric) Muscle Energy Technique (cont.):

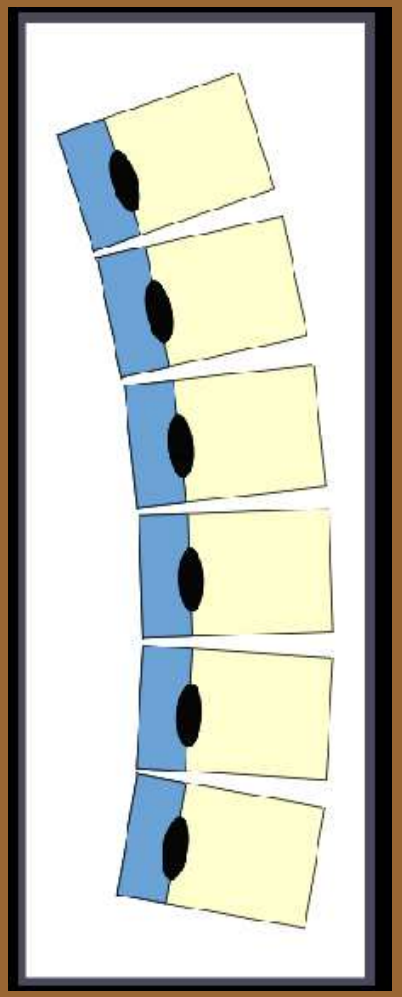
6. Patient and physician simultaneously cease contraction.
7. A pause of 1-2 seconds is necessary for neuromuscular adaptation (post-relaxation phase). Physician senses tissue relaxation.
8. Physician "takes up the slack" by repositioning the patient at the new restrictive barrier.
9. Repeat steps 2-8 until no further change is obtained.
10. Reassess for appropriate change. (gives you insight into efficacy and prognosis)

Performing Technique

- Localization
  - Palpate and monitor tissue at area of dysfunction
  - Move trunk in each plane of motion until you first feel the tissue tighten (feather's edge)
- Activating Force
  - Coach patient to lightly contract against your resistance

Spinal Motion:
Principle 1- Neutral Motion, Type I

- The figure depicts articulated spinal vertebrae displaying Neutral, Type I physiologic motion
- Sidebending and rotation occur in opposite directions- $S_L R_R$
- Tend to occur in groups



REAL PATIENT CASE

S: **45 y/o male c/o mid back pain that started 2 weeks ago after being hit in the middle of his back. Hurts the most when he tries to stand up straight. Ice/heat provide no relief; Ibuprofen has helped some, and pain is a little better than when it first happened, but still keeping him from doing work activities he needs to do.**

O: **VSS; HRRR, LCTAB, BSx4; Musculoskeletal exam finds TTC & tenderness at T4-6 and these vertebra are NS_LR_R; posterior T4 counterstrain TP; R. ribs 4-5 inhaled.**

Demo/Practice:

Lower Thoracic Muscle Energy (direct seated)

Dx: T4-T12 NS_LR_R

1. Pt. sits, dr. behind pt.;
2. Pt. grasps back of head
3. Dr. grasps pt. arm & contacts posterior TP w/ other thumb
4. Dr. engages all barriers
5. Pt. turns right as dr. resists for 3-5 sec.
6. Both relax 2sec., then dr. takes to new barrier; process repeated 3x

Demo/Practice:

Upper Thoracic Muscle Energy (direct seated)

Dx: T1-T3 NS_LR_R

1. Pt. sits, dr. behind pt.;
2. Pt. grasps back of head
3. Dr. grasps pt. arm & contacts posterior TP w/ other thumb
4. Dr. engages all barriers
5. Pt. turns right as dr. resists for 3-5 sec.
6. Both relax 2sec., then dr. takes to new barrier; process repeated 3x

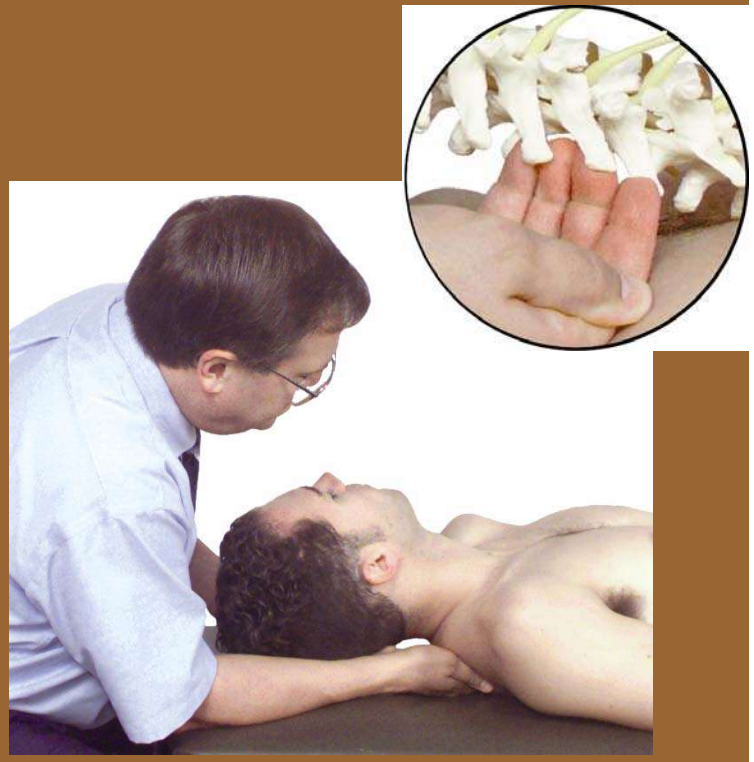
Kimberly Manual 2008
page 112 – 4341.11A

Demo/Practice:

Supine-Upper Thoracic Muscle Energy

Dx: T1-T3 NS_LR_R

1. Pt. supine, dr. at head of table
2. Place finger of r. hand on left side of SP of segment as fulcrum
3. L. hand on l. side of head rotates left & SBs r. to segment
4. Pt. tries to SB left against dr. resistance for 3-5sec.
5. Both relax 2 sec. & repeat 3x at new barrier



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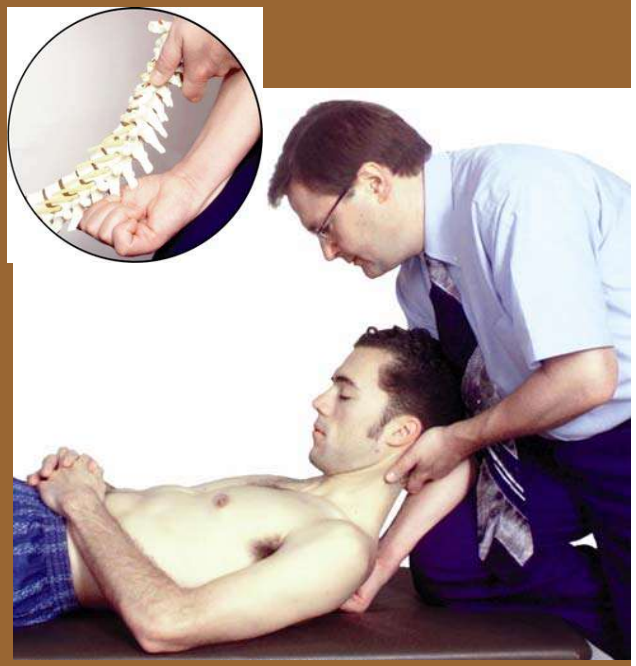
Kimberly Manual 2008
page 117 – 4341.11G

Demo/Practice:

Supine-Upper Thoracic Muscle Energy

Dx: T1-T3 Extension

1. Patient supine w/physician standing at head of table
2. Grasp lower segment of dysfunctional vertebral unit w/thumb & index finger
3. Flex spine down to restrictive barrier
4. Pt. tries to push head back against dr. resistance for 3-5sec.
5. Both relax 2 sec. & repeat 3x at new barrier; Recheck



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page 111 – 4332.11A

Non-neutral Mechanics

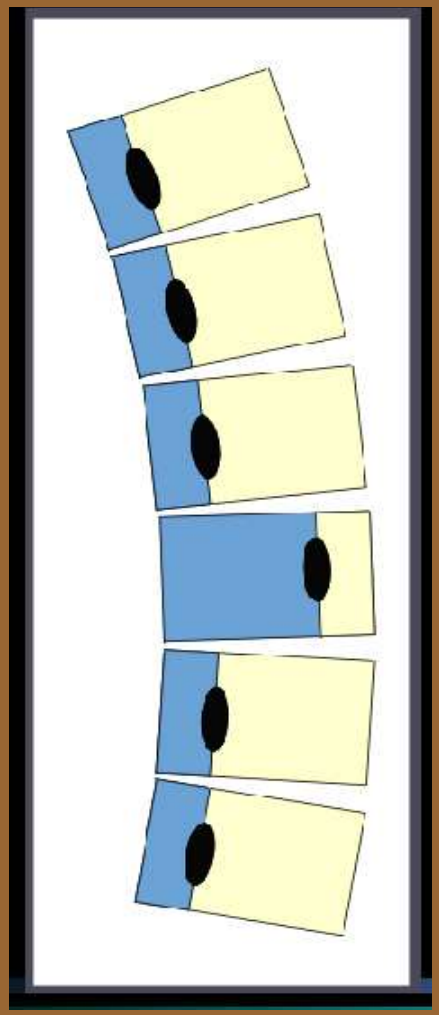
- **The range of sagittal plane spinal positioning in which the second principle of physiologic motion of the spine applies**
  - **When the thoracic and lumbar spine are sufficiently forward or backward bent (non-neutral), the coupled motions of sidebending and rotation in a single vertebral unit occur in the same direction.**
  - ***Occurs when sagittal plane motion exceeds the neutral range***
- **Posterior elements and facets describe motion**

Glossary of Osteopathic Terminology 2011

Type 2 Somatic Dysfunction

- Tend to occur at a single segment
- Localize the sagittal plane (F or E) first so rotation & sidebending will couple in the same direction.

Non-neutral Motion, Type II



- The figure depicts articulated spinal vertebrae displaying Non-neutral, Type II physiologic motion
- When sagittal plane enters non-neutral range (flexion or extension), rotation and sidebending occur in the same directions
- Non-neutral motion commonly occurs with a single segment located at the apex (ex: T5 E $R_L S_L$, but T4, 6, 7 $NS_L R_R$)

Demo/Practice:

Seated- Thoracic Muscle Energy

Dx: T4-T12 non-neutral, ER_LS_L

1. Pt. sits, dr. behind pt.;
2. Contact L. TP w/ l. thumb
3. Dr. contacts pts. head (upper segments) or L. Shoulder (lower segments)
4. Dr. engages all barriers
5. Pt. turns left as dr. resists for 3-5 sec.
6. Both relax 2sec., then dr. takes to new barrier; process repeated 3x

OR

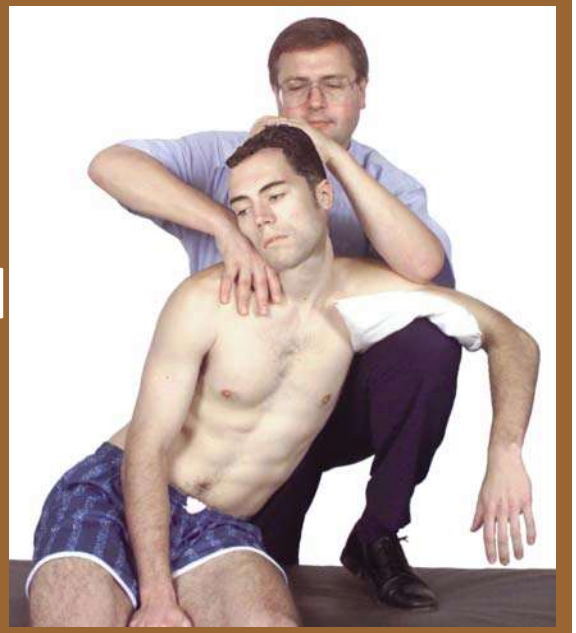
Kimberly Manual 2008
page 103 – 4322.11A

Demo/Practice:

Seated- Upper Thoracic Muscle Energy

Dx: T1-T3 Type II, ER_LS_L

1. Pt. sits, dr. behind pt.
2. Place L. foot on table and put pts. L. arm over your knee
3. Using right thumb pad, contact right side of spinous process of dysfunctional segment
4. Your L. hand is on head
5. Dr. engages all barriers
6. Pt. sidebends left as dr. resists for 3-5 sec.
7. Both relax 2sec., then dr. takes to new barrier; process repeated 3x



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REAL PATIENT CASE

A: 1. Pain in Thoracic Spine (Dorsalgia)
2. Somatic Dysfunction of Thoracics & Ribs

P: 1. Based on today's exam, OMT given including ME to thoracic spine; indirect BLT to ribs & counterstrain to tenderpoint.
2. Patient Tolerated OMT well
3. self stretches given to patient for mid back
4. F/U in 2-4 wks.

PARTING SHOT

- *Muscle Energy is a form of osteopathic manipulative diagnosis and treatment in which the patient's muscles are actively used on request, from a precisely controlled position, in a specific direction, and against a distinctly executed physician counterforce*
- *Most commonly used as a direct method technique*
- *Isometric Contraction (most common use)*
- *Can be used to treat both Type 1 & Type II Thoracic Somatic Dysfunctions*

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