MUSCLE ENERGY FOR CERVICAL SPINE

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LEARNING OBJECTIVES

1. List conditions in which muscle energy of the cervical spine is a useful treatment modality
2. Explain the history of muscle energy
3. Understand indications and contraindications for cervical spine muscle energy
4. Apply muscle energy in treating a patient with neck pain

NO FINANCIAL DISCLOSURES

- I have no actual or potential conflict of interest in relation to this program/presentation.

HISTORY OF MUSCLE ENERGY

- Fred Mitchell, SR, DO, is recognized as the original developer of muscle energy technique
- Descriptions of Muscle energy technique were first published in 1948 as "The balanced pelvis in relation to Chapman's reflexes"
- In 1958 more detail was added and published as "Structural pelvic function."
- Dr. Mitchell taught the first muscle energy tutorial in 1970.

TECHNIQUE PRINCIPLES

- “A system of diagnosis and treatment in which the patient voluntarily move the body as directed by the physician; this directed patient action is from a precisely controlled position against a defined resistance by the physician” (Education Council on Osteopathic Principles or ECOP definition).

MUSCLE ENERGY PRINCIPLES

- Some osteopathic physicians (such as Hollis Wolf, and Nicholas S Nicholas) suggest that this technique is a variation of the technique performed by TJ Ruddy, D.O.

- Ruddy's technique was known as rhythmic resistive duction which differs by classic muscle energy in that it does not have the physician position the patient before the patient force is activated.

WHIPLASH

- One of the most common cervical injuries is whiplash

- As part of your initial assessment do not forget to rule out RED FLAGS
  - Radiculopathy
  - Infection
  - Fracture
  - Tumor

WHAT IS WHIPLASH INJURY?

Whiplash is an acute injury of moderate intensity which causes a strain to the bones, muscles, tendons, discs and ligaments of the neck region

WHIPLASH

IMAGING

MECHANISM OF INJURY

- The mechanism is an acceleration-deacceleration event that causes soft tissue injury in the cervical region

- The most common dysfunction is a C4 extension injury

KEY POINT

- Engage sidebending, rotation, flexion/extension barrier to the point the patient is resisting. Take it to the "feathers edge." THEN have the patient provide resistance.

TECHNIQUE CLASSIFICATION

- DIRECT technique

- The dysfunction is positioned toward the restrictive barrier

TYPES OF MUSCLE CONTRACTION USED IN MET

- ISOMETRIC
  - MOST common form of contraction used in muscle energy technique
  - The origin and insertion of the muscle are maintained in a stationary position while the muscle is contracted against resistance
- ISOTONIC
  - Activates muscles where the attachment of the muscle remains fixed
  - Goal is to restore normal mechanics to joint or muscle
- ISOLYTIC
  - Used for the treatment of fibrotic muscles
  - The applied counterforce is greater than the patient force resulting in lengthening of the myofascial tissues

MUSCLE ENERGY TECHNIQUE STYLES

- Post Isometric Relaxation
  - In this form, the muscle performs an ISOMETRIC contraction
  - During this contraction, **increased tension** is placed on the Golgi tendon proprioceptors within the muscle tendon
  - This causes a reflex inhibition and subsequent **INCREASE** in muscle length within the hypertonic muscle
  - Secondary effects on **soft tissue** also help in pain relief

MUSCLE ENERGY: POST ISOMETRIC RELAXATION

- HEAT is generated during the isometric muscle contraction and this HEAT has the same effect on soft tissues as myofascial or ST treatment

- Heat leads to a change in the connective tissues from gel to solution which leads to improvement in blood and lymphatic flow

WHEN IS MUSCLE ENERGY MOST EFFECTIVE?

- Based on the mechanism of action, MET is most useful in subacute to chronic conditions where muscle shortening and fibrosis is present

- The force of the contraction should be both tolerable and comfortable for the physician and the patient!

RECIPROCAL INHIBITION

- This type of muscle energy technique is better for ACUTE conditions (but can also be used in subacute/chronic)

- The principle of this technique is when the agonist contracts, the antagonist relaxes.

    - Example: If someone has an acute hamstring strain, treating the quadriceps (contraction) causes the hamstrings to further relax

JOINT MOBILIZATION USING MUSCLE FORCE

- Purpose: to improve joint motion that is restricted

- Uses an ISOTONIC contraction

  *The patient uses more force than the physician

MET WITH RESPIRATORY ASSIST

- Goal:
  - To produce improved body physiology using patients voluntary respiratory motion
  - Motion from breathing activates muscles from the entire axial skeleton and the extremities

INDICATIONS FOR MUSCLE ENERGY

- Primary Indications:
  - Somatic dysfunctions of myofascial origin
  - Hypertonic, shortened, tight muscles
  - Restricted motion

- Secondary Indications
  - To improve circulation and respiratory function
  - To balance neuromuscular relationships
  - Increase tone in weak muscles

CONTRAINDICATIONS

- ABSOLUTE
  - Fracture
  - Dislocation
  - Joint instability
  - Lack of cooperation or consent by the patient

- RELATIVE
  - Moderate to severe acute muscle strains or sprains
  - Severe osteoporosis that would risk tendon rupture
  - Severe illness (post-op or ICU patient)

GENERAL RULES OF COUNTERSTRAIN

1. The physician positions the bone, joint or muscle to the "feathers edge" of the restrictive barrier in all **3 planes** of motion (x, y, z).
2. The physician instructs the patient to contract in the opposite direction against the physicians counterforce for **3-5 seconds**
3. The physician instructs the patient to **relax completely** (generally for 2-3 seconds) and slowly repositions the patient to the new restrictive barrier
4. Repeat the above steps until the best possible increase in motion is obtained. **May require 3 to 7 repetitions.**
5. **Recheck**

MUSCLE ENERGY: GENERAL CONSIDERATIONS

- Muscle energy may be combined with other techniques such as soft tissue, myofascial release, counterstrain, articulatory, HVLA, etc.

- If the physician is unsuccessful with MET, it may be because:
  - The dysfunction is severe or very chronic
  - The diagnosis was inaccurate
  - Localization or positioning was incorrect
  - Patient force was too gentle or too forceful or too short in duration
  - Patient did not relax completely between repetitions

SAFETY AND EFFICACY OF MET

- Muscle energy techniques are inherently safe

- Too vigorous a contraction could cause soreness or muscle spasm

INITIAL EVALUATION OF C-SPINE

- Assess range of motion both ACTIVE and PASSIVE
  - The predominant motion in the upper cervical spine (OA to C2) is ROTATION
  - The predominant motion in the lower cervical spine (C3-7) is SIDE-BENDING

- Palpation
  - Evaluate for TART
  - Perform intersegmental motion testing

NORMAL RANGE OF MOTION OF THE C-SPINE

- Flexion: 60-90 degrees
- Extension: 70 degrees
- Side-bending: 20-45 degrees
- Rotation: 70-90 degrees

NEUROLOGIC SCREENING

- Strength
- Sensation
- Deep tendon reflexes
  - C5 Biceps
  - C6 Brachioradialis
  - C7 Triceps

SPURLING TEST

- Specific, but not sensitive, test for acute cervical radiculopathy
- Extend the neck, sidebend and rotate and apply a compressive force

DIAGNOSIS OF SOMATIC DYSFUNCTION IN THE UPPER C-SPINE

- C1-2 is where most of the rotation occurs, flex the cervical region to at least 30 degrees and check rotation
- In the lower cervical spine, side-bending is predominant
- Physician can find areas of restriction by translating each vertebral segment side-to-side
- When a restricted segment or group is found, check the area in flexion/extension for somatic dysfunction diagnosis

RULE OF 3'S

- After diagnosing a Type I or Type II somatic dysfunction, engage the **3** barriers of restriction (Flexion/Extension, Rotation, Side-bending).

- Have the patient provide an isometric force for at least **3** seconds

- Relax and repeat **3** times

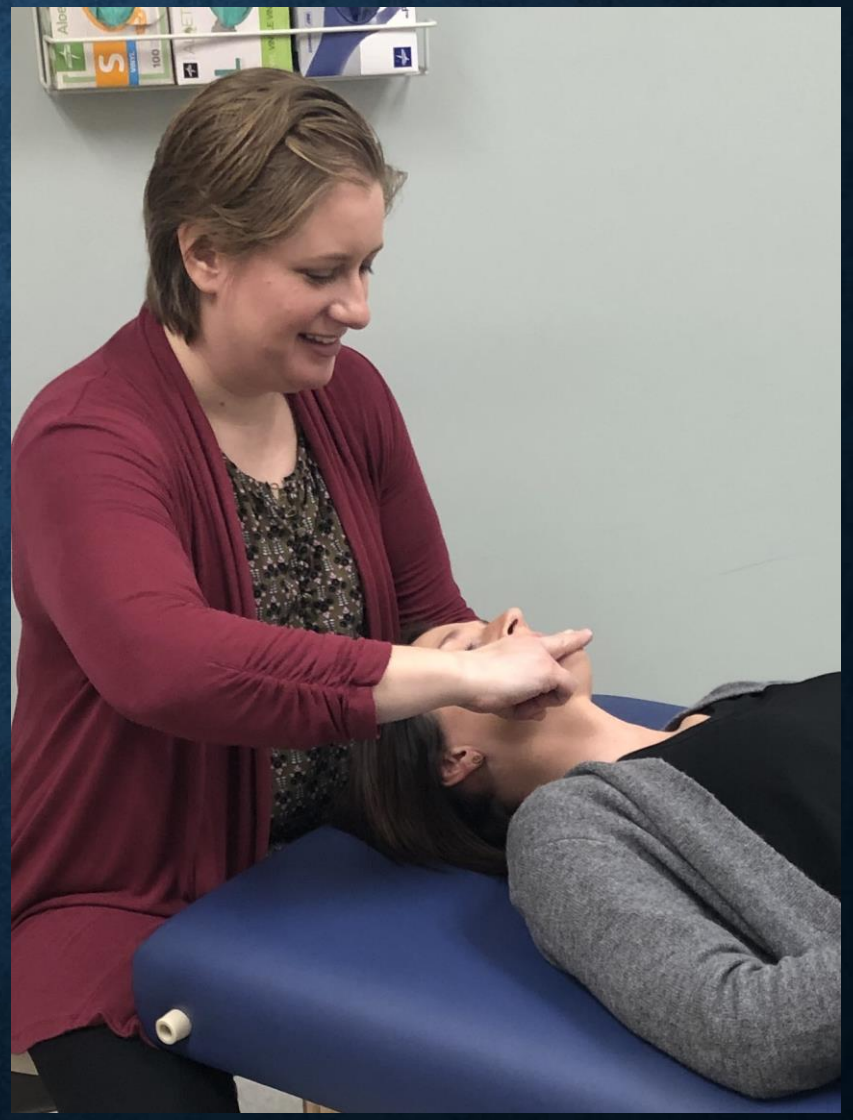
PHYSIOLOGIC PRINCIPLES

- Dr. Chila describes 9 different physiologic principles of muscle energy technique
  - Joint mobilization using muscle force
  - Respiratory Assist
  - Oculocephalogyric reflex
  - Reciprocal inhibition
  - Crossed extensor reflex
  - Isokinetic strengthening
  - Isolytic strengthening
  - Using muscle force to move one region of the body to achieve movement of another
  - Postisometric relaxation

CRANIOCERVICAL SOMATIC DYSFUNCTION

- Dysfunction: Occiput is restricted in extension on C1

- Patient is supine, physician is at the head of the table with one hand in the suboccipital region and the other hand on the chin
- Pt is instructed to tilt their head backward so that their chin comes up into the physicians fingers



CERVICAL- TYPE 2 SOMATIC DYSFUNCTION

EXAMPLE: C4 ERSR

1. Place 1st MCP at site of dysfunction

2. Flex, Sidebend and Rotate LEFT to engage barrier

3. Gentle force by patient

CERVICAL SPINE STRETCH WITH MET

- Physician positioned at the head of the table
- Flex the cervical spine to the barrier
- Have the patient engage by extending back into the physicians hands

OCULOCEPHALOGYRIC REFLEX

- GOAL: To affect reflex muscle contractions using eye motion

- Physiologic Basis:
  - Functional muscle groups are contracted in response to voluntary eye motion on the part of the patient.
  - These eye movements reflexively affect the cervical and truncal musculature as the body attempts to follow the lead provided by eye motion

SCALENE/LEVATOR STRETCH WITH MET

Goal: to reduce tension in the lateral neck muscles

- Physician is positioned at the head of the table.
- Cervical spine is side bent and rotated away
- The physician puts pressure on the shoulder
- Patient shrugs the shoulder toward their ear

MULTIPLE CHOICE QUESTIONS

Muscle energy is classified as _____?

A) Direct

B) Indirect

C) Neither

The most common type of muscle contraction used in muscle energy treatment is ____?

A. Isotonic

B. Isolytic

C. Isometric

QUESTIONS

Which of the following is an ABSOLUTE contraindication to muscle energy treatment?

A. Acute sprain or strain

B. Hospitalized patient

C. Fracture or Dislocation

D. Geriatric patient

E. Pediatric patient

THANK YOU

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RESOURCES

- AACOM OMT Modules (2014).
- Rowane, M. and Evans, P. Basic Musuloskeletal Manipulation Skills: The 15 Minute Office Encounter (2012)
- Nicholas, A. & Nicholas, E. (2008). Atlas of Osteopathic Techniques.
- Chila, A.G. Foundations of Osteopathic Medicine 3rd Ed. (2011)
- Academy of Osteopathy Files. (2013).

I AM AN OSTEOPATHIC PHYSICIAN, WHAT'S YOUR SUPER POWER?