

TREATING LUMBAR AND THORACIC SPINE MOBILITY DEFICITS USING MUSCLE ENERGY TECHNIQUES

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- No conflict of interest present in today's presentation.
- The views expressed in these slides and the today's discussion are mine and do not represent GLATA or Purdue University,
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OBJECTIVES

- Learn basic muscle energy technique for the lumbar and thoracic spine.
- Correctly select and match indications and contraindications to patient.
- Practice application of common muscle energy techniques through scenario based group discussion and lab activities.
- Discuss the use of manual therapy as an adjunct to therapeutic exercises in rehabilitation of common injuries.

OUTCOME

Goal:

- Make assessment and use of muscle energy easy for treating alignment and mobility problems in the thoracic and lumbar spine



CLINICAL SCENARIOS

- Your athlete says they've had acute low back pain ever since they were working out in the weight room
- Your client says that they felt "something happen" in his/her back after landing from a jump
- Your patient reports difficulty "twisting and/or bending over" after injuring back trying to pull-start their mower



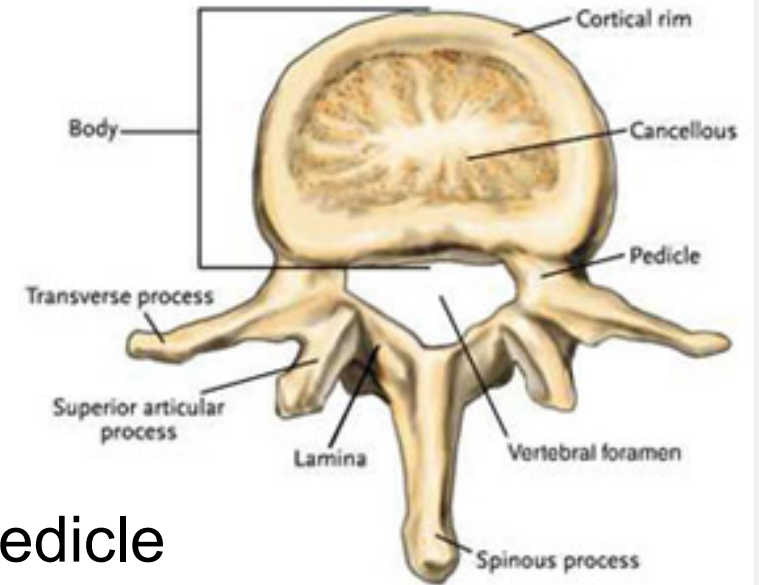
COMMON DEFICIT PROFILE

- Possible leg length discrepancy
- Possible changes in facet joint articulation
- Diminished lumbar sideglide
- Tight hip flexors
- Tight quadratus lumborum
- Tight piriformis
- Weak gluteus medius
- Inhibited gluteus maximus
- Inhibited transversospinalis musculature
- Weak hip lateral rotators



OBLIGATORY ANATOMY REVIEW

- General Vertebral Osteology
 - Vertebral body
 - Spinal Arch
 - **Zygapophyseal joint (facet joint)** is between pedicle and lamina



OBLIGATORY ANATOMY REVIEW

- Posterior Trunk Myology
 - Erector Spinae (Mobility)
 - Iliocostalis
 - Longissimus
 - Spinalis
 - Transversospinalis (Stability)
 - Semispinalis
 - Multifidus
 - Rotatores

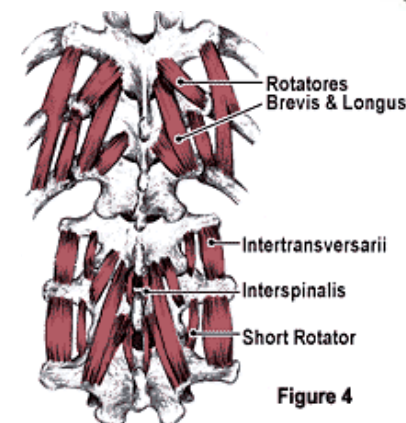
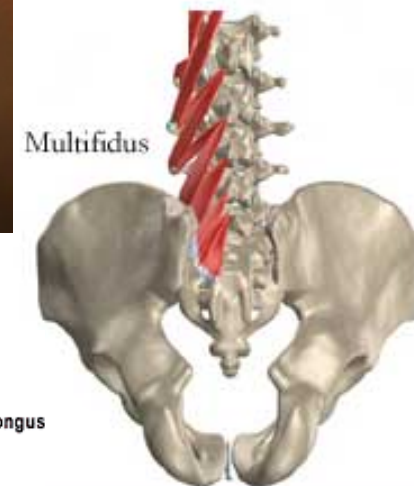
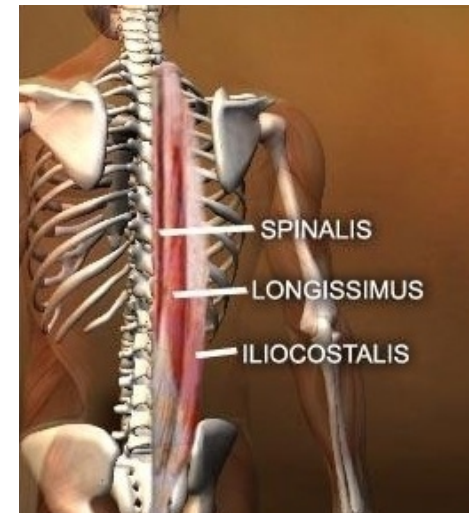
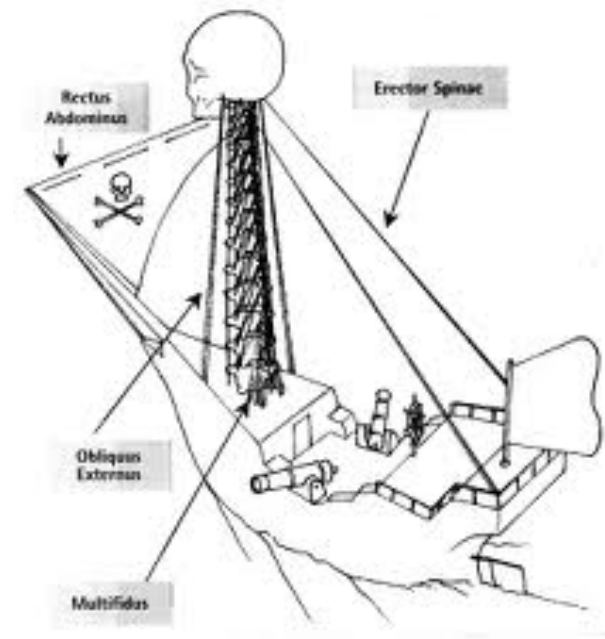


Figure 4

LUMBAR SPINE TENSEGRITY

- Neutral joint position with ideal structural length of a muscle relative to its synergists and antagonist



SPINAL COLUMN MOVEMENT

- Movement Considerations
 - Flexion: facet joints open
 - Extension: facet joints close
 - Sidebending: facet joints on the convex side are distracted, facet joints on concave side are compressed
 - Rotation: compression on one side with distraction on the opposite side
 - Coupled motions: rotation and sidebending of the spine are always combined together

FRYETTE'S LAWS OF PHYSIOLOGICAL MOTION

- First Law
 - When the spine is in a neutral position, flexion and extension will occur in the opposite direction to the rotation of the vertebrae
- Second Law
 - When the spine is in a neutral position, sidebending and rotation will occur in the same direction
- Third Law
 - Anytime a vertebral segment moves in one plane, movement decreases in the other planes of movement

Does These Really
Matter?????

TREATMENT OPTIONS

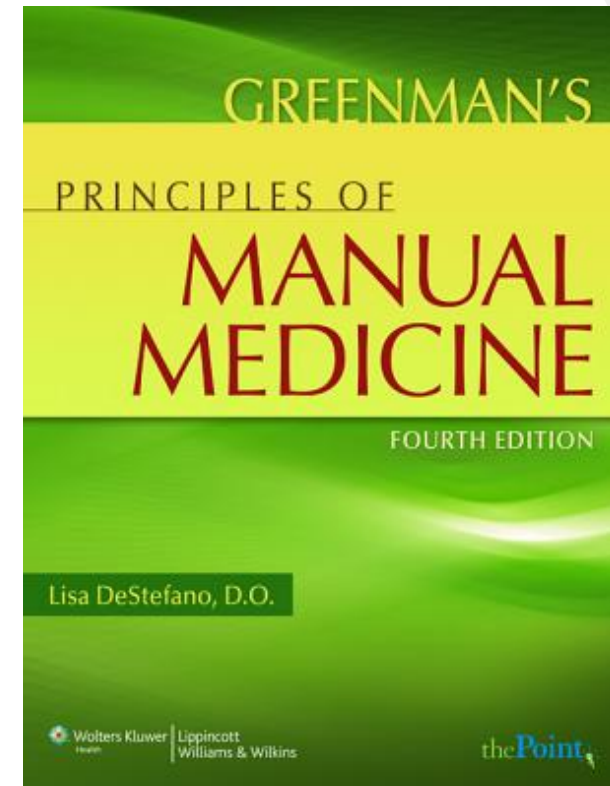
- Manipulation
- Modalities
- Therapeutic Exercise
- Manual Therapy

WHAT IS MUSCLE ENERGY?

- A manual medicine procedure which involved voluntary contraction of the patient's muscle in a precisely controlled direction at varying levels of intensity, against a distinctly executed counterforce applied by the operator.
- Muscle energy can be used with precision to facilitate and inhibit spinal muscles from the atlas to the sacroiliac.

HOW DOES IT WORK?

- Physiologic mechanisms of muscle energy are complex and beyond the scope of this talk



ESSENTIAL STEPS IN TREATMENT

1. Position the lesion area against the physiologic barrier following all three planes of motion
2. Apply a counterforce to maintain this physiologic barrier
3. The patient is instructed to place a specific force in a specific direction against the operator



ESSENTIAL STEPS IN TREATMENT

4. A contraction lasting 3-5 seconds is applied by the patient against the operator's counterforce
5. The operator then "takes up the slack" in the tissues to the next physiologic barrier
6. The contraction sequence is again repeated until a total of three contraction-relaxation cycles are performed
7. The area is then re-assessed for resolution of the dysfunction

POST-TREATMENT INSTRUCTIONS

- Advise the patient of possible post-treatment soreness or stiffness (24-72 hours)
- Patient should drink plenty of fluids
- Patient should be careful with all activities and body mechanics for 24-48 hours
- Advise patient to call if severe, unrelenting pain occurs
- Home exercise program

COMMON OPERATOR ERRORS

- Not accurately controlling the patient's joint position at the proper barrier
- Not providing counterforce to the patient's contraction in correct direction
- Inadequate patient instruction
- Moving the patient too soon into the next joint position after muscle contraction

CONTRAINDICATIONS

- Fracture
- Painful muscle, tendon, ligamentous structures with significant tissue damage
- Significant muscle spasms
- Uncooperative patient



FINDING THE PROBLEM

- Muscle energy requires an accurate application of forces and thus the evaluation of the movement dysfunction is crucial
- Evaluation of motion:
 - Gross spinal motion
 - Segmental motion

Assumption: you've already cleared alignment problems in the sacroiliac joint and pelvis

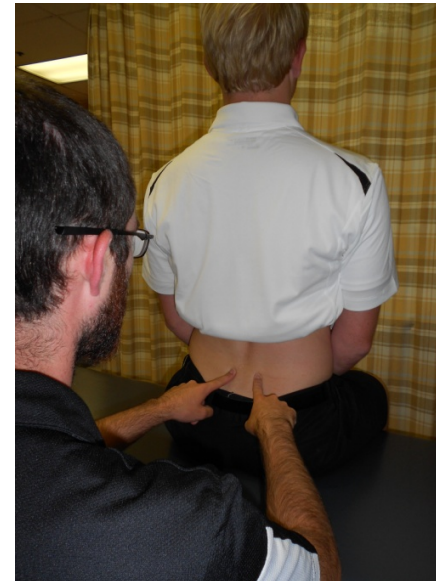
GROSS SPINAL MOTION ASSESSMENT

Note: quality of motion, amount of motion, degree of rotation, complains of pinching with extension, diminishment or exaggeration of spinal curves



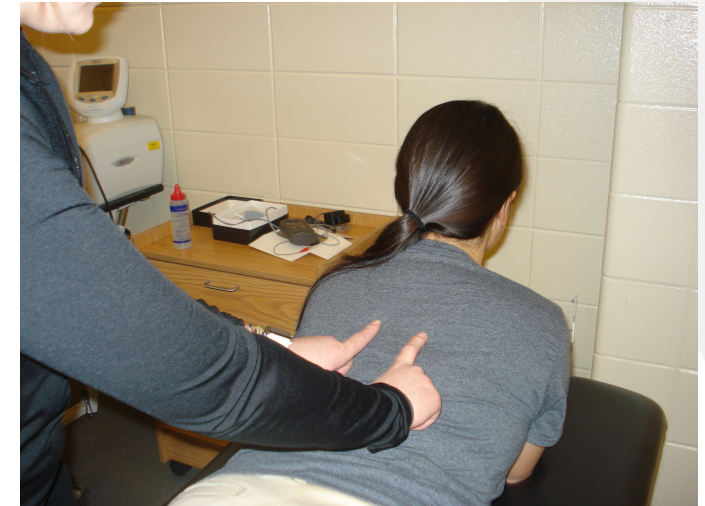
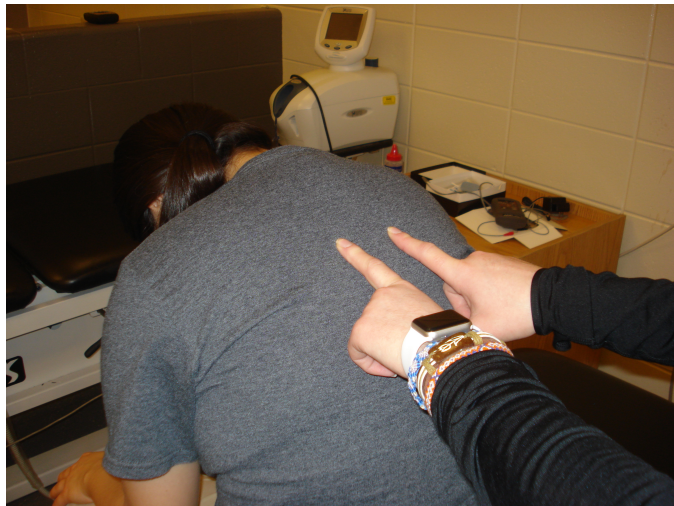
SEGMENTAL MOBILITY ASSESSMENT

- Positional palpation – lumbar spine
 - Flexed, neutral, and extended position
 - Is the segment neutral vs. rotated to the right or the left



SEGMENTAL MOBILITY ASSESSMENT

- Positional palpation – thoracic spine
 - Flexed, neutral, and extended position
 - Is the segment neutral vs. rotated to the right or the left



GROUP VS. SEGMENT DYSFUNCTION

- Group dysfunctions (Type I) involve 3 or more segments in a row
 - Dysfunction is usually due to a long muscle crossing the area: quadratus lumborum, latissimus dorsi, erector spinae
- Segment dysfunctions (Type II) involve a single vertebral unit
 - Most commonly seen

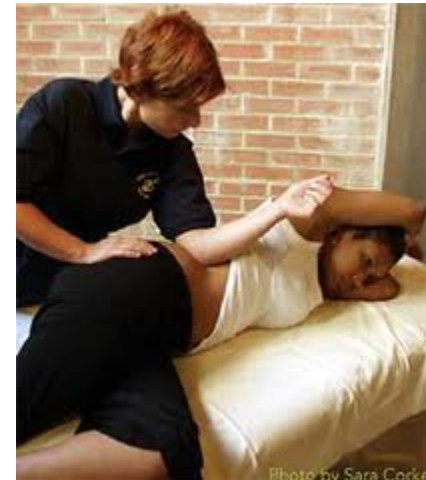
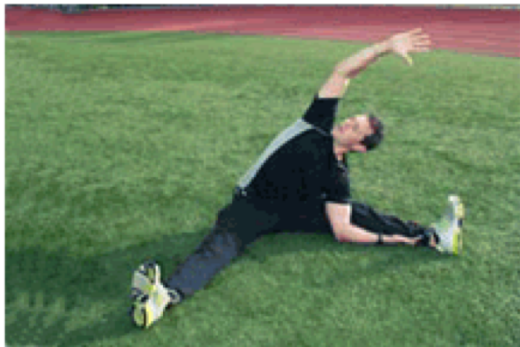
LAB

- Work with a partner or in a small group to assess spine mobility
 - Can you identify areas of decreased mobility grossly?
 - Gross ROM
 - Can you identify areas of decreased mobility segmentally?
 - Positional palpation
 - Can you name the dysfunction?



TREATING GROUP VS. SEGMENT DYSFUNCTION

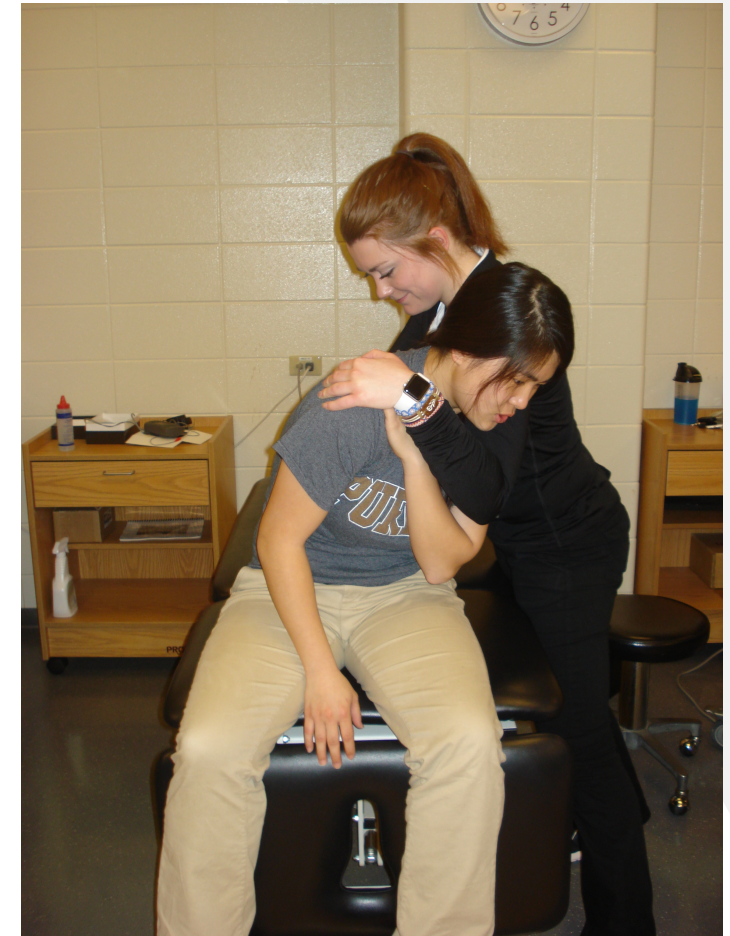
- Group dysfunctions (Type I) = therapeutic exercises, modalities, manual therapy



- Segmental dysfunctions (Type II) = Muscle Energy

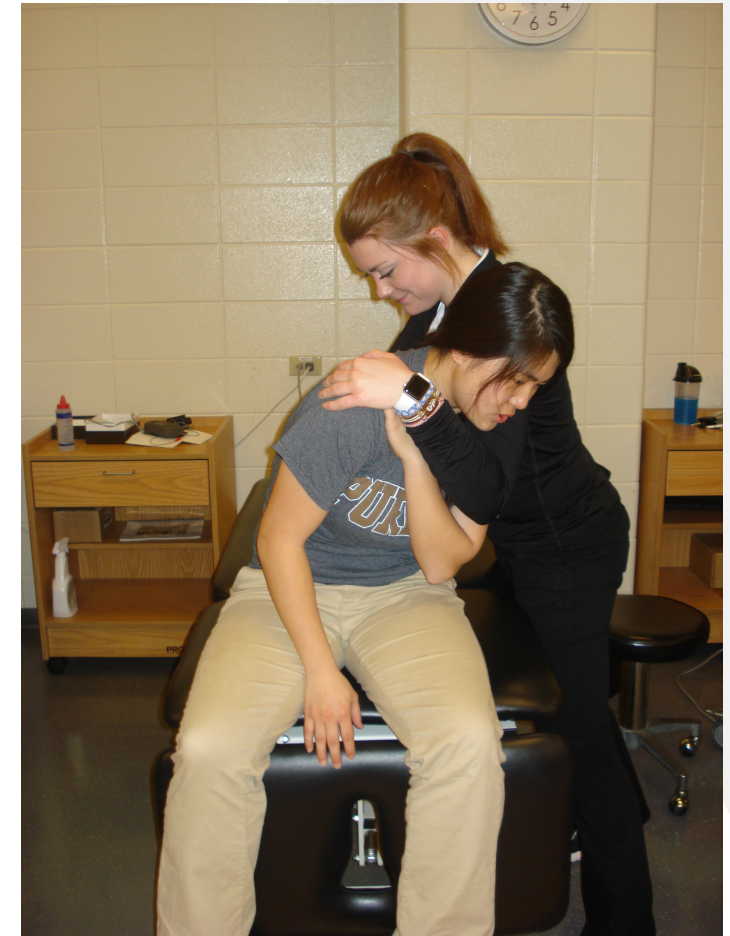
TREATING TYPE II DYSFUNCTIONS - THORACIC

- Patient positioning
 - Place them in a seated position with legs off the end of table
 - Stand to the side of the patient where you are going to sidebend them toward
 - Patient will cross that arm over their chest



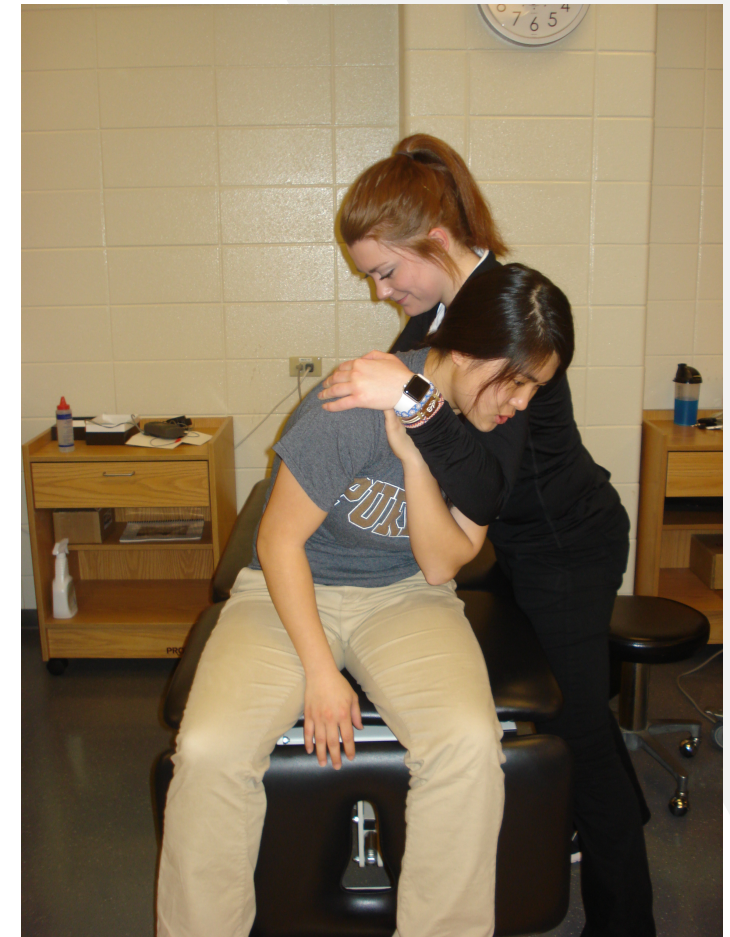
TREATING TYPE II DYSFUNCTIONS - THORACIC

- Finding the barrier (1 of 2)
 - The trunk is flexed or extended until motion is felt in the involved segment
 - If the prominent transverse process was found in **flexion**, the trunk should be **extended** until the segment moves
 - If the prominent transverse process was found in **extension**, the trunk should be **flexed** until the segment moves



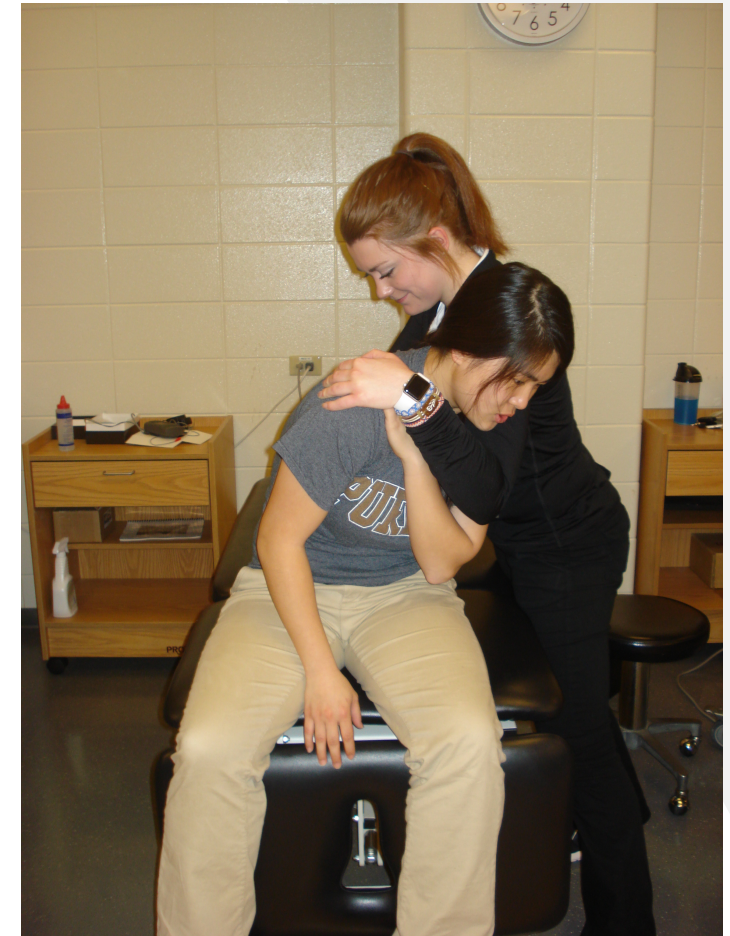
TREATING TYPE II DYSFUNCTIONS - THORACIC

- Finding the barrier (2 of 2)
 - Maintain trunk flexion or extension while moving the patient into sidebending until the segment you are monitoring moves
 - Maintaining this position, add passive rotation into you until you once again feel the segment start to move



TREATING TYPE II DYSFUNCTIONS - THORACIC

- Treatment
 - Examiner tries to rotate the patient back toward a neutral position while patient holds position
 - Minimal force is needed
 - Contraction held for 3-5 seconds
 - Examiner “re-establishes” the barrier with further rotation
 - A total of 3 contractions are performed
 - Be sure not to rush the treatment → time must be allowed for musculature to relax



TREATING TYPE II DYSFUNCTIONS - THORACIC

- Re-assess
 - Segmental motion
 - Gross motion (comparable sign)

LAB

- Work with a partner or in a small group to treat thoracic spine mobility
 - Try muscle energy segmental positioning
 - Stand on opposite side of the rotation you found
 - Flex/extend the patient until you feel the segment move
 - Sidebend to segment motion, rotate to segment motion
 - Have them hold while you rotate them back to a neutral position
 - Repeat 3 times, take advantage of the post-isometric relaxation response
 - Re-assess!



TREATING TYPE II DYSFUNCTIONS - LUMBAR

- Patient positioning
 - Place them in a sidelying position on the side the transverse process is **MOST PROMINENT**
 - Example: the right L5 transverse process was prominent in extension (and neutral) so the patient would be treated sidelying on right side

TREATING TYPE II DYSFUNCTIONS - LUMBAR

- Finding the barrier (1 of 2)
 - The bottom shoulder is “pulled out” from underneath them – i.e. pulled into anterior protracted position
 - This introduces sidebending into lumbar spine
 - The legs are flexed or extended until motion is felt in the involved segment
 - If the prominent transverse process was found in **flexion**, the hips should be **extended** until the segment moves
 - If the prominent transverse process was found in **extension**, the hips should be **flexed** until the segment moves

TREATING TYPE II DYSFUNCTIONS - LUMBAR

- Finding the barrier (2 of 2)
 - The top shoulder of the patient is then pushed posteriorly toward the table until the barrier is felt



TREATING TYPE II DYSFUNCTIONS - LUMBAR

- Treatment
 - Patient actively tries to rotate back toward a neutral position while examiner holds position
 - Minimal force is needed
 - Contraction held for 3-5 seconds
 - Examiner “re-establishes” the barrier with further rotation
 - A total of 3 contractions are performed
 - Be sure not to rush the treatment → time must be allowed for musculature to relax



TREATING TYPE II DYSFUNCTIONS - LUMBAR

- Re-assess
 - Segmental spinal motion
 - Gross spinal motion (comparable sign)



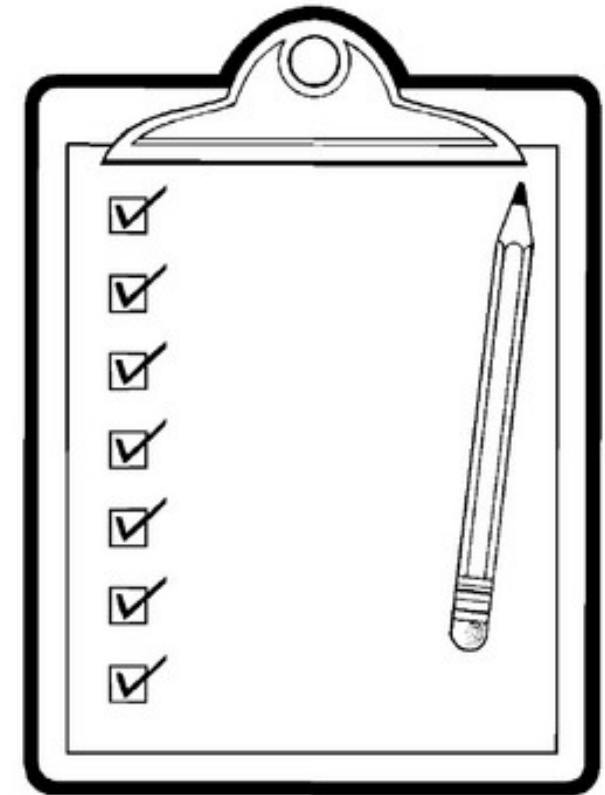
LAB

- Work with a partner or in a small group to treat lumbar spine mobility
 - Try muscle energy segmental positioning
 - Have them start by laying on the side they are rotated toward
 - Pull bottom shoulder forward, flex/extend hips until segment moves
 - Have them hold while you rotate them back to the table
 - Repeat 3 times, take advantage of the post-isometric relaxation response
 - Re-assess!



EVALUATION/TREATMENT ALGORITHM

- At this point...
 - Pelvic ring is balanced
 - Normal joint springs are present
 - Lumbar and thoracic spine is clear of positional faults
- This is a good time to start a core stability program...



EVALUATION/TREATMENT ALGORITHM

- At this point, it's important to consider the effects of the ripple wave...
- Issues in the low back can cause problems in other areas and vice versa
- It's common to have decreased hip mobility and/or decreased thoracic spine extension in combination with low back pain



EVALUATION/TREATMENT ALGORITHM

- Now our patients have...
 - Pelvic ring balanced
 - Normal joint springs
 - Clean lumbar spine
 - Improving core stability
 - Improving hip mobility
 - Improving thoracic spine mobility
- At this point, any remaining symptoms likely coming from hypertonic musculature

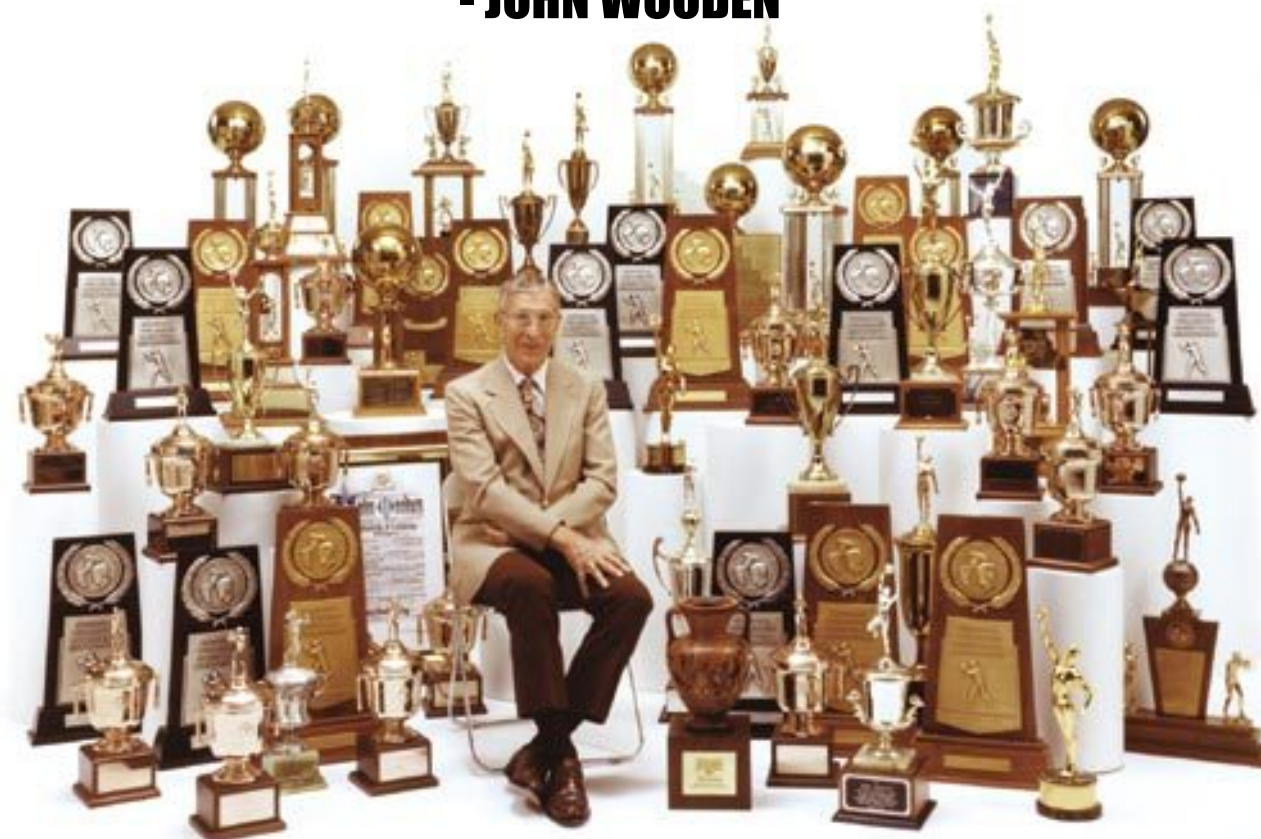
Can work on at the same time



SUMMARY

- Perform an accurate and complete evaluation
- Be precise with patient positioning and your force application
- Whatever position you find the vertebrae in, you do the opposite to treat it (Ex: FRS right – ERS left it)
- Do not use too much force with your technique
- This should not be the only thing you do – muscle energy is an adjunct to therapeutic exercise, not a replacement

DON'T EVER MISTAKE ACTIVITY FOR ACHIEVEMENT!
- JOHN WOODEN



QUESTIONS?

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