Structural and functional assessment for low back pain

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Disclosure statement

- We have no affiliations with any other companies or institutions represented here at this symposium.
Needs Assessment

- Osteopathic manual therapy and movement-based physical therapy can address pain in a comprehensive and systematic approach.
- Improving alignment of joints, restoring precise motion, and balancing muscle length/strength can all unload chronic tissue strain to restore function in non-invasive ways.
- Encourages patients to be active participants in their own care.
- Long-term strategies in management of chronic pain.
- Assessing patients that may benefit from these practices is often challenging for practitioners not trained in manual medicine. We hope to give you some tools to change that and understand these approaches better...
Learning Objectives

1. Perform a brief Structural and visual inspection to examine patients for resting postural faults.
2. Briefly document structural exam findings in clinical notes.
3. Employ appropriate referrals for osteopathic manual treatment and movement-based physical therapy, specifically MSI developed by Dr Sahrmann DPT, PhD
19th & 20th Century


- Chiropractic: BB. Palmer (1845-1913). Not educated in medicine, was self educated manipulative therapist and possibly a student of Dr. Still in Kirksville Missouri.
Osteopathic Physicians

- All trained in manual component of Osteopathic medicine
- Small percentage utilize
- Mostly PCP and NMM DO’s
- Variety of approaches
Physical Therapy Evolves

- Reconstruction Aides employed to treat WWI soldiers later branched into the professions of PT and OT.
- The impact of the polio epidemic and two world wars increased the profile of the profession and increased the demand for services.
- In 1960, a Bachelor’s degree was required to practice PT. The educational minimum was changed to a Master’s degree in 2002.
- By 2020, all physical therapy degrees are required to be Doctorate level.
Movement System Impairment Syndromes

- Concept developed by Shirley Sahrmann, PT, PhD FAPTA, at Washington University in St. Louis, Missouri
- Systematic approach to musculoskeletal pain that results in movement syndromes as diagnostic categories
- “Collection of impairments based on observable abnormalities that are primarily kinesiological, and their relationship to a patient’s symptoms”
Movement System Impairment Syndromes

- During evaluation, painful movements are corrected to evoke positive change in symptoms as part of diagnostic practice
- Kinetic chain above and below involved area evaluated for paths of least resistance and relative flexibility/stiffness
- Syndromes named for the primary impairment - the movement/motion that causes the most symptoms. There are 5 diagnostic categories for lumbar pain.
Lumbar Spine Syndromes

- Lumbar Extension
- Lumbar Flexion
- Lumbar Rotation
- Lumbar Rotation with Extension
- Lumbar Rotation with Flexion
Lumbar Extension Syndrome

- Chronic LBP or multiple repeat episodes
- Generally older/short patients
- Abdominals are weak/long, check for diastasis recti
- Trunk extensors are strong/stiff
- Hip flexors are short/stiff
- Hip extensors are long
- Sit/stand in lumbar extension
Lumbar Flexion Syndrome

- Generally younger 18-45 years, taller
- Acute pain, often associated with disc herniation
- Rectus Abdominus are strong/stiff
- Paraspinals are weak/long
- Hip flexors are long
- Glute max are stiff/short
- Hamstrings are stiff/strong
- Sit/stand in lumbar flexion
Lumbar Rotation

- Pain with side bending, rotation, flexion and extension
- Symptoms are often unilateral or greater on one side
- Paraspinal asymmetry at rest
- External Oblique on one side and Internal Oblique on opposite side are weak/long
- Asymmetry in rotation or sidebending motion
- Sits with legs crossed, sits on one foot or feet forward and trunk turned to screen, client etc.
Lumbar Rotation with Extension

- Symptoms are often unilateral or greater on one side
- Generally older patients
- Paraspinal asymmetry
- Poor abdominal control/strength (can’t disassociate lumbar motion from LE motion)
- Apparent leg-length discrepancy
- Sits with legs crossed, often stands more on one leg
- Repetitive actions of rotation and extension i.e. cashiers, warehouse, volleyball, tennis
Lumbar Rotation with Flexion

- Symptoms are often unilateral or greater on one side
- Paraspinal asymmetry
- Poor abdominal control/strength (can’t disassociate lumbar motion from LE motion)
- Apparent leg-length discrepancy
- Sits with legs crossed, often stands more on one leg
- Job or recreation involve repeated unilateral limb movement or trunk rotation
Key Concepts

- Path of least resistance (relative stiffness/flexibility) derived from repeated activities and prolonged postures.

- Presence or strength of a muscle does not mean it is used functionally. “That’s a nice muscle you’re wearing”

- Hyper-mobility (too much joint motion) causes pain and degeneration, co-morbidities compound issue

- Precision is essential, especially in everyday tasks; where are they moving?

- Strength in isolation does not always translate to functional use
Path of Least Resistance

Relative Flexibility/Stiffness

A

less flexible

more flexible

B

not flexible

short

C

more flexible

< stiff m

less flexible

not short

stiff m

Passive stretch of stiff & < stiff muscle in series → elongation of least stiff muscle

Most important: FLEXIBILITY of joint of spine NOT stiffness or shortness of muscles RELATIVE
Pain: Cause VS Source

- **Cause**: The mechanical factor (movement) that results in irritation of tissue.
  - Associated with repeated movements and prolonged postures that lead to muscle changes i.e. short/stiff paraspinals, short/stiff hip flexors.
  - Example: lumbar extension.

- **Source**: The tissue or anatomical structure that is symptomatic.
  - Example: lumbar facet arthropathy, lumbar spondylolysis.
Structural Screening Examination

1. Static posture- analysis of paired anatomic landmarks
2. Standing forward flexion and return
3. Trunk rotation
4. Trunk side bending
5. single leg stance
6. Squatting
7. Lower extremity screening
Static Analysis of Posture

- Observed from the front: evaluating weight distribution, carriage, shoulder level and foot placement
- Observed from the back: evaluating head carriage, shoulder height, level pelvis, and weight distribution of the feet
- Observed from the side: posture against plumb line external auditory meatus through acromion through the femoral trochanter to just in front of the medial malleolus pelvic tilt
- Combined palpation and observation
- Palpation of the iliac crest in preferred stance, then heights with feet together and feet apart
Static Analysis of Posture

- Orientation of pelvis
  - Anterior/posterior tilt
  - Rotation R/L
- Lumbar spine curve
  - Lordotic, flat, neutral
  - Normals vary in literature
- Alignment of lower extremities
  - Knees locked versus soft
  - Medially rotated femurs
  - Pronated ankles
Standing forward bend and return

- Standing trunk flexion
  - Correct motion should initiate from hips, should have 70 degrees of hip flexion at end range and reversal of lumbar curve
  - Faulty motions of minimal to no hip motion (all lumbar/thoracic motion) or posterior ankle sway (long hamstrings and poor glut max activation)
  - Presence of pain?
...and return

- Return from flexion
  - Correct motion should initiate from hips
  - Faulty motion will show lumbar spine extension
  - Pain?
Rotation

- Rotation
  - Thoracic spine vs hips (should initiate motion from hips)
  - Symmetrical right/left
  - Symmetrical paraspinal MM palpation observation
  - Look for hinge point in vertebrae (level of mobility/hypermobility)
Trunk Side Bending

1. Observation from the back
2. Side bending left and right
3. Observation of the symmetry of motion (fingertip distance on the lateral leg)
4. Spinal curve should be smooth and symmetric-fullness should be on the side of the convexity straightening of segments and fullness on side of concavity suggests vertebral motion segment dysfunction hinge??
5. Pelvic shift- loading of the lower extremities should be symmetric
Single leg stance

- Should be able to perform with feet 4-6 inches apart and no significant deviations
- Compensations
  - Lateral trunk shift (weak gluteus medius)
  - Pelvic rotation (weak hip lateral rotators)
  - Hip drop (Trendelenberg) (weak gluteus medius)
  - Moving foot to midline (overuse of hip adductors)
  - Ability to balance with limited motion
Squat

- Should be able to perform with feet hip width apart with no significant deviations
- Does back extend on lowering or on return (weak under recruited glute max or long/weak abdominals)
- Does pelvis rotate or does one side go high (stiff paraspinals, stiff hip adductors/abductors)
- Femurs move into medial or lateral rotation (elongated glutes/lateral rotators or over recruited adductors)
- Minimal tibial anterior translation
Lower Extremity Screening

- Length/relative flexibility of hamstrings/quads can affect pelvic alignment
- Length/relative strength of abdominals (diastasis recti in men) and over/under use of back extensors affects lordosis
- Weak glute max, glute med are often compensated for with back extensors, piriformis, TFL, adductors)
Why Combine OMT and PT

- Correction of alignment through OMT first improves spinal movement to allow restoration of altered movement patterns
- Movement based physical therapy gives patients better understanding of how habitual postures and activities contribute to chronic stress on tissues
- Whole body approach to treatment
Why Combine OMT and PT

- Benefits of comprehensive treatment
  - Direct communication between practitioners
  - Hands on approach
  - Strong focus on patient education
  - Empowers patients to be active participants in their own care
  - Empowers patients to learn management strategies for care of long term problems
OMT and MSI Physical Therapy

- Multiple approaches
- Poor evidence in benefits of modalities
- Exercise better?
- Better exercise even better?
- Compliments osteopathic principles and biomechanical approach
Modification of Functional Activities

- Change daily activities to avoid DSM, prolonged postures, chronic tissue strain
- Sleeping
- Sitting
- Standing
- Sit to stand
- Desk/workplace set-up
- Driving/car transfers
- Household/child care activities
- Recreational activities
Compliance

- Incorporate new movement into daily activities
- Awareness of postural habits
- Small amount of exercise in short increments
- Form changes in recreational activities
- Learning difference between pain, strain and work
- Learning to control hypermobility/hyperflexibility
I think this can go
Jessica Elson, 3/27/2019
Conclusion: Why OMT and Movement Based Physical Therapy?

- Comprehensive evaluation and diagnosis
- Restore normal physiological motion
- Decrease pain and improve function
- Appropriate diagnostics, medications and interventions
- Patients have independent management plan
- Education, improved knowledge and realistic expectations
Thank you!
References

- Sahrmann S. *Diagnosis and Treatment of Movement Impairment Syndromes*. St. Louis, MO: Mosby Inc; 2002.
References