Overview of Manual Therapy Assessment and Treatment of the Thoracolumbar Spine

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- OCS thru APTA
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- Teaching Experience
  - Adjunct University of Dayton
  - College of Mt. St. Joseph
  - Continuing Education
WHAT IS MANUAL THERAPY?

- A clinical approach utilizing skilled, specific hands-on techniques, including but not limited to manipulation/mobilization, used by the physical therapist to diagnose and treat soft tissues and joint structures for the purpose of modulating pain; increasing range of motion (ROM); reducing or eliminating soft tissue inflammation; inducing relaxation; improving contractile and non-contractile tissue repair, extensibility, and/or stability; facilitating movement; and improving function.¹,²

(Definition from American Academy of Orthopedic Manual Physical Therapy (AAOMPT) and American Physical Therapy Association (APTA).

Anatomy and Biomechanics of the Lumbar Spine

Lumbar Osseous Review

- L3/4 viewed from above
  - Spinous process
  - Lamina
  - Superior articular process
  - Transverse process
  - Pedicle
  - Vertebral body
  - Ligamentum flavum
  - Posterior longitudinal ligament
  - Anterior longitudinal ligament
Lumbar Facet Planes

Lumbar Spinal Segment

- Pars Interarticularis
- Facet joint
- Interspinous ligament
- Supraspinous ligament
- Anterior longitudinal ligament
- Posterior

Muscular Support
Muscular Support

Forward Bending

- Thoracic
  - Facets are almost vertical and the ribs also play a role
    - Facets slide up bilaterally
    - Ribs rotate on their long axis
- Lumbar
  - Facets translate superiorly bilaterally
  - Annulus bulges anteriorly and flattens posteriorly

Backward Bending

- Thoracic Spine
  - Facets slide down bilaterally
  - Ribs rotate
- Lumbar Spine
  - Facets slide down bilaterally
  - Facets fulcrum on the lamina
  - Facet joints open up cephalically (tilt)
  - Annulus bulges posteriorly and flattens anteriorly
Lumbar Sidebending and Rotation

The following illustration shows four different motions:

A. Flexion
B. Extension
C. Neutral position
D. Rotation

Non-neutral Functional

Sidebending and rotation are coupled in the same direction

Neutral Lumbar Spine
Non-Neutral
Non-Functional

Sidebending and rotation are coupled in opposite directions

Fryette’s Laws

1. When the spine is in neutral, sidebending to one side will be accompanied by horizontal rotation to the opposite side. In type I somatic dysfunction this law can be seen when more than one vertebrae are out of alignment and cannot be returned to neutral by flexion or extension.

2. When the spine is flexed or extended (non-neutral), sidebending to one side will be accompanied by rotation to the same side. In type II somatic dysfunction of the spine, this law can be seen when only one vertebrae is out of place and becomes much worse on flexion or extension.

3. When motion is introduced in one plane it will modify (reduce) motion in the other two planes. Type III sums up the other two laws by stating dysfunction in one
Manual Therapy Evaluation of the Thoracic and Lumbar Spine

- **Subjective History**
  - Mechanism of injury
  - Chief complaints
  - Diagnostic tests/results
  - Pain scale
  - Characteristics/Progression of symptoms
  - Past Medical History
  - Medications
  - Occupation/Activities

- **Red flags**
  - Night pain
  - Bowel and Bladder dysfunction
  - Saddle paresthesias
  - Marked myotome weakness/paresis

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Manual Therapy Evaluation of the Thoracic and Lumbar Spine

- **Neurovascular Assessment**
  - Myotomes
  - Reflexes
  - Sensation

- **Strength/Flexibility testing**
- **Special Tests**
- **SIJ, hip...**
- **Passive Intervertebral motion (Paris)**
- **Palpation**
  - Flexion, neutral, extension (DO)
Manual Therapy Evaluation of the Thoracic and Lumbar Spine- Video Demonstration

• Passive Intervertebral Motion
  – Lumbar flexion
  – Lumbar sidebending
  – Lumbar rotation

• Joint mobility testing/Spring testing
  – Thoracic posteroanterior spring
  – Lumbar rotation spring testing

Lumbar and Thoracic Manipulations

• Indications for Manipulation
  – Restricted accessory joint motion
  – Neurophysiological benefit and pain control
Lumbar and Thoracic Manipulations

• Contraindications/Precautions for Manipulation
  – Disease states
  – Hemarthrosis
  – Muscle holding
  – Fracture
  – Acute Inflammation
  – Fusion/ Joint replacement
  – Anticoagulant therapy
  – Osteoporosis
  – Instability/Hypermobility
  • Spondylolisthesis

Grades of Manipulation

Grades of Manipulation

- Non-Thrust
  - Maitland- Grade I
  - Grade II
  - Grade III
  - Grade IV
  - Traditional- stretch
  - Paris- progressive
  - oscillation
  - Mulligan- mobilizes with active movement

- Thrust
  - Traditional- High Velocity Low Amplitude (HVLAT)

- Distraction
  - Traditional- Manual Mechanical
  - Paris- Positional
Lumbar and Thoracic Manipulations

- Video Demonstration
  - Thoracic Posteroanterior Manipulation
  - Lumbar rotation via transverse process
  - Lumbar sidebending
    - Prone
    - Sidelying
  - Positional Distraction- SV Paris

Common Diagnoses that may benefit from Manual Therapy

- Facet Joint Arthropathy
- Osteoarthritis
- Lumbar Disc Protrusion/Herniation
  - Subacute, Chronic
  - “Sciatica”
- DDD
- Lumbar Sprain/Strain
- Lumbar Stenosis
  - Central
  - Foramenal

Poor Posture and Body Mechanics can contribute to...

- Muscle Imbalance/ Adaptive shortening
- Joint restrictions
- Areas of relative hypo/hypermobility
- Facet arthropathy
- DDD
- Compromise of neural foramen
- Lumbar disc protrusion/herniation
Key Tips to Remember…

- Education!
  - Posture
  - Proper Body Mechanics
  - Ergonomics
- Treatment to improve posture and optimize intended spine biomechanics

Key Tips to Remember…

- Treat joint restrictions with manipulation
- Stabilize areas of hypermobility
- Avoid manipulative forces thru hypermobile segments (i.e. spondylolisthesis)
- Joint restrictions may not be where the patient complains of pain/tenderness
- Pain is deceiving/ referral patterns

Key Tips to Remember…

- Lumbar Disc Protrusion
  - Acute- annular wall tear, posterior-posterolateral, avoid flexion, rotation, and especially a combination of both
  - Too much extension may cause a dessication
  - NO ROTATION MANIPULATION (acute-subacute)
- Warm up prior to manipulation is beneficial
- If cavitation occurs (pop), reflex inhibition
- After acute phase/palliative treatments, go to the source of the problem
  - Disc Protrusion- symptom
  - Muscle “sprain/strain” may be guarding due to underlying problem.
### Case Study #1

**Lumbar Strain**
- Pt. is a 42 y/o male c/o pain in the R side of his low back that began while playing catch with his son.
- Denies radicular Sx.
- c/o pain during AROM with flex. (veers R), SB L, and ROT R.
- Guarding, increased tone R lumbar paraspinals.
- Joint mobility testing:
  - Decreased SB L at L3/4, L4/5.
  - Decreased ROT R at L3/4, L4/5.
  - Decreased PA mobility T4/5.

**Manual Therapy Treatment**
- R L3/4, L4/5 facet dysfunction?
- Manipulation to gap/open R lumbar facets L3/4, L4/5.
  - Lumbar SB L (prone, sidelying).
- STM may be beneficial prior to manipulation to decrease muscle guarding.
- Manipulation to increase.

### Case Study #2

**Lumbar Disc Protrusion**
- Pt. is a 32 y/o male c/o severe pain in his Left low back which radiates down to his calf after bending over to pick up the newspaper.
- Guarded movements, sits shifted to R.
- Pt. has decreased AROM flex, SB L, and mild decrease in ext.
- Decrease great toe ext. strength on L.

**Manual Therapy Treatment**
- Pt. Education/Posture! Positional distraction- R sidelying over bolster to open neural foramen of L4/5, L5/S1 on L.
- Lumbar SB R manipulation?
- As acute phase subsides, reassess joint mobility and manipulate restrictions.
  - may begin with Lumbar SB over Rot initially.
  - Also assess thoracic mobility.

### Case Study #3

**Chronic Low Back Pain**
- Pt. is a 57 y/o female c/o chronic low back pain, she has a h/o L4/L5/S1 fusion 10 years ago.
- Osteopenia, increase thoracic kyphosis.
- Denies radicular Sx.
- Residual Myotome weakness from HNP, R gastroc.
- Increase joint mobility L4/5, L5/S1 with tendemese, decreased.

**Manual Therapy Treatment**
- STM/MFR prior to joint manipulation.
  - Muscle imbalance.
  - Adaptive shortening.
  - Decrease pain.
- Joint manipulation to restricted thoracic segments.
  - Grade of manipulation?
  - Block unstable segment.
  - SIJ/hips?
Evidence Supporting Manual Therapy of the Lumbar/Thoracic Spine


References


• Paris SV. *Manipulation and Management of the Spine.* S1 thru S4. University of St. Augustine, St. Augustine, FL 32086

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