Overview of Manual Therapy Assessment and Treatment of the Cervicothoracic Spine

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- DPT, MTC thru University of St. Augustine
- OCS thru APTA
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- BS- Miami University

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 of the Cervical Spine

- Spinous Process
- Articular pillar formed by articular process and interarticular parts
- Zygapophyseal joints- 45°
- At T1 – 1st costal facet for 1st rib
Mid-Cervical Vertebra

- Body
- Transverse Process
- Anterior tubercle
- Posterior tubercle
- Groove for spinal N.
- Transverse foramen
- Pedicle
- Superior articular facet
- Inferior articular process
- Vertebral foramen

Anatomy of C1 and C2

Atlas (C1) Anatomy

Axis (C2) Anatomy

Ligaments of the Cervical Spine

- Tectorial membrane becomes PLL
- Capsule of OA joint
- Capsule of AA joint
- Capsule of zygapophyseal joint
Ligaments of the Cervical Spine

- Anterior Longitudinal Ligament

Ligaments of the OA joint

- Alar ligaments
- Cruciate ligament
- Apical ligament of dens

Cervical Spine Ligaments

- Ligamentum nuchae
- Ligamenta flava
- Spinous process of C7 vertebra
- Vertebral a.
Biomechanics of the Cervical Spine

- Mid cervical forward bending
- Facets slide up, approx. 40% displacement
- Lateral interbody joints slide forward
- Vertebrae step minimally
- Spinal canal narrows but lengthens, volume remains the same.
Biomechanics of Cervical Spine

- Mid Cervical Backward Bending
  - Facets slide down, then fulcrum on pedicle.
  - Lateral interbodies slide back
    - Vertebrae step considerably!
  - Ligamentum flavum bulges inward
  - Spinal canal shortens and narrows significantly
  - Cord may be compressed in the presence of degenerative changes

Biomechanics of Cervical Spine

- Mid Cervical Sidebending /Rotation Right
  - Facets slide down and back on the right
  - Facets slide up and forward on the left, causing right rotation

Biomechanics of Cervical Spine

- If patient is instructed to face forward with sidebending Right, AA Rotation Left has occurred.
- If patient is instructed to rotate right, keeping eyes level with the horizon, SB Left occurs subcranially (OA, AA).
- Approx. half of cervical rotation originates from the AA joint (C1/C2).
Anatomy/Biomechanics of the upper thoracic spine

- T1 has a unifacet for articulation of the first rib
- T1 through T3 generally follow lower cervical biomechanics
- Lower thoracic segments similar to lumbar spine

Cervical Evaluation

- Observation/Posture
  - Symmetry, resting position of head on neck
  - Forward Head Posture (FHP)
  - Increase/Decrease in thoracic kyphosis
- AROM testing
  - Flexion, Extension, SB R/L, ROT R/L
  - Veers R/L with flexion/extension
  - SB R/L, seated, arms supported/unsupported
  - Rotation—should recruit down to approx. T3
  - OA nodding/SB, AA rotation
Cervical Evaluation

- Neurovascular assessment
- Special Tests
  - Alar Odontoid Integrity
  - Transverse Ligament
  - Vertebral A.??
- Precautions, trauma, diagnostic tests

Cervical Evaluation

- PROM/joint mobility testing
  - Supine, neutral to slight flexion
  - OA/AA mobility
  - Check SB R/L, Rot R/L
  - Cervical upglides
  - Cervical downglides
  - Upper thoracic joint mobility (from supine, PA)
  - 1st rib mobility
- Muscle length, Soft tissue restrictions
- Palpation

Cervical Evaluation

- Video Demonstration
  - Cervical upglides
  - Cervical downglides
  - Upper thoracic PA mobility
  - 1st rib mobility- depression
Cervical and Upper Thoracic Manipulation

Indications for Manipulation
- Restricted accessory joint motion
- Neurophysiological benefit and pain control.

Contraindications/Precautions for Manipulation
- Disease states
- Hemarthrosis
- Hypermobility
- Muscle holding
- Fracture
- Acute inflammation
- Fusion/Joint replacement
- Anticoagulant therapy
- Osteoporosis
Grades of Manipulation

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

- Thrust
  - Traditional: High Velocity Low Amplitude (HVLAT)
  - Distraction
    - Traditional: Manual Mechanical
    - Paris: Positional

Cervical Manipulation Techniques - Video Demonstration

- Cervical upglides
- Cervical downglides
- Upper thoracic PA mobility
- 1st rib mobility: depression
- Cervical Traction
- Suboccipital Release/Inhibitive Distraction
Common Diagnoses that may benefit from Manual Therapy
- Cervical DDD
- Cervical OA, facet arthropathy
- Cervical Radiculopathy
  - Disc protrusion/herniation
  - Foraminal stenosis due to OA
- Cervical Sprain/Strain
- Cervicogenic Headache

Forward Head Posture can contribute to...
- Muscle Imbalance/ Adaptive shortening
- Joint restrictions
  - Areas of relative hypo/hypermobility
- Facet arthropathy
- DDD
  - Compromise of neural foramen
- Cervicogenic Headaches
- Thoracic Outlet Syndrome
- TMJ disorders

Key Tips to Remember
- Treatment to improve posture/ reduce FHP and optimize intended cervical spine biomechanics
- Treat joint restrictions with manipulation
- Stabilize areas of hypermobility
- Avoid manipulative forces thru hypermobile segments
Key Tips to Remember

- Joint restrictions may not be where the patient complains of pain/tenderness
- Pain is deceiving/referral patterns

Case Study 1

Cervical Radiculopathy

- Patient is a 39 y/o CPA (in April!) and has a pronounced FHP
- Pain increases Rotation R, SB R, and Ext.
- Intermittent R UE burning down to elbow, n’t in R hand
- Weakness in C6 myotome
- Tenderness over R

Manual Therapy Treatment

- Acute phase
  - Manual traction straight pull
  - Add slight SB L/Rot L, flex
  - Suboccipital release
- Subacute
  - Cervical upglides on R?
  - Upper thoracic manipulation
  - 1st rib depression
- Chronic
  - Address other joint restrictions, soft tissue restrictions
Case Study 2

Left Upper Trapezius Strain

- Patient is a 24 y/o student, woke with pain on L side of neck
- Pain and decreased LB and L Rotation and Ext. ROM
- Pain and decreased downglide C3/C4 facet
- Trigger point in L UT and pain with L UT

Manual Therapy Treatment

- Cervical downglides on Left side
- If c/o pain with downglide, try cervical upglides on Right side.
- Recheck joint mobility
- Reassess L UT, may try massage/stretching if

Case Study 3

Cervical DDD, HAs

- Patient is a 58 y/o female, complaining of bilateral neck pain and headaches
- X-rays show DDD at C5/C6 and C6/C7
- Patient has sedentary desk job and a significant FHP/increased thoracic kyphosis
- Denies radicular Sx
- Complains of increasing

Manual Therapy Treatment

- Posture! Education/Ergonomics
- Manipulate joint restrictions- upper/mid thoracic, upper/mid cervical?
- Caution: hypermobility at C5/6, C6/7??
- Suboccipital Release/Inhibitive distraction
- OA, AA manipulations if restrictions present- also may decrease Has
- Address soft tissue

Evidence Supporting Manual Therapy of the Cervical Spine

Evidence Supporting Manual Therapy of the Cervical Spine


References

- Anatomy pictures

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


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