Equine Cervical Mobilization and Manipulation

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What is Joint Mobilization & Manipulation

• Manual techniques
  – Used to modulate pain
  – Used to increase ROM
  – Used to treat joint dysfunctions that limit ROM by specifically addressing altered joint mechanics

• Factors that may alter joint mechanics
  – Pain & Muscle guarding
  – Joint hypomobility (Fixation)
  – Joint effusion
  – Contractures, fibrosis or adhesions in joint capsules or supporting ligaments
  – Degenerative joint disease

Mobilization

• Passive Mobilization
  – Passive joint movement for increasing ROM or decreasing pain
  – Applied to joints & related soft tissues at varying speeds, amplitudes or rhythm
  – Force is light enough that patient’s can stop the movement

• Dynamic or Active Mobilization
  – Dynamic or active joint movement that is carried out and controlled by the patient
Manipulation

- Characterized by manual thrust delivered at high velocity in a specific direction
- Incorporates a sudden, forceful thrust that is beyond the patient’s control
- Performed at the physiologic joint motion limit (Elastic Barrier) and into paraphysiologic space
- Only done after receiving appropriate training
  - Veterinary Spinal Manipulative Therapy
  - Osteopathic
  - Chiropractic

Mechanics of Manipulation

- Force = Mass x Acceleration
  - Increasing mass increases force but increases tissue damage
  - Increasing acceleration increases force without increasing tissue damage
- Specific contact point and a specific line of direction

Joint Motion

Adapted from Leach 1994
Effects of Joint Mobilization & Manipulation

- **Neurophysiological effects**
  - Stimulates mechanoreceptors to pain
  - Affect muscle spasm & muscle guarding – nociceptive stimulation
  - Increase in awareness of position & motion because of afferent nerve impulses
  - Experimental body of evidence exists indicating that spinal manipulation stimulates primary afferent neurons from paraspinal tissues, the motor control system, and pain processing

- **Nutritional effects**
  - Distraction or gliding movements – cause synovial fluid movement
  - Movement can improve nutrient exchange that results from joint swelling or immobilization

- **Mechanical effects**
  - Improve mobility of hypomobile joints (adhesions & thickened CT from immobilization – loosens)
  - Maintain extensibility & tensile strength of articular tissues

Contraindications of Joint Mobilization & Manipulation

- **Avoid the following**
  - Acute inflammation
  - Malignancy
  - Ligamentous rupture
  - Neurological Disease
  - Vertebral fracture
  - Cervical Vertebral Malformation
  - Infection

Research Validation of Vertebral Motion

  - The largest changes in intersegmental angles were at C6, especially for the chin-to-top and chin-to-arms mobilization exercises
  - The angle at C1 revealed considerable bending in the chin-to-girth position but not in the 2 more caudal positions

  - Smallest FE ROM was in the C5-C6 joint and the largest was in the C3-C4 joint
  - Smallest AR ROM was in the C5-C6 joint and largest AR ROM was in the C1-C2 joint
  - Smallest LB ROM was in the C3-C6 joint and the largest LB ROM was in the C7-T1 joint
Research Validation of Vertebral Motion

  - The largest angular differences involved the cranial and caudal cervical joints with smaller angular differences in the mid-neck.
  - The articulations at the extremities of the cervical vertebral column are primarily responsible for sagittal plane position and orientation of the head and neck.
  - Ex vivo extension of the cervical spine causes a decrease in intervertebral foramina dimensions at segments C4–T1, similar to that found in man.
  - In vivo extension of the cervical spine could possibly interfere with peripheral nerve functioning at segments C4–T1.

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CLINICAL CERVICAL MOBILIZATION & MANIPULATION

What we are Treating

- Primarily joint dysfunction
  - Abnormal Motion
  - Primarily decreased motion
- Vertebral Subluxation Complex
  - Chiropractic definition
Vertebral Motion

- Flexion – extension
- Axial rotation
- Lateral bending
- Coupled motion
- Compression/tension
- Vertical shear
- Horizontal shear

Vertebral Motion Segment

- Two adjacent vertebrae and all associated soft tissues
  - Vertebral ligaments
  - Joint capsules
  - Intervertebral foramen content
  - Intervertebral disk
  - Muscles

Types of Fixations

- Vertebral motion segment unable to move from neutral position
- Vertebral motion segment unable to move completely through its range of motion
- Vertebral motion segment unable to return to its neutral position
Prior to Mobilization & Manipulation

- Complete History
- Complete Physical Exam
- Evaluate conformation and symmetry
- Watch walking and trotting straight line
- Watch walking tight circles and backing
- Any evidence of lameness, marked pain or neurologic signs stop and have evaluated by veterinarian

Occiput – C1

- “Yes” Joint
- The OA joint is classified as a ginglymus with a hinge-like action and its movements are mainly flexion and extension, with some lateral oblique gliding
- SCP – C1 on side of fixation or dorsally
- Rest head on opposite shoulder
- LOD – towards episternal notch or P-A

Occiput – C1 Motion
C1 Passive & Manipulation

• “No” Joint
• Trochoid or pivot joint
• Primarily rotation, but also some flexion-extension & bending
• SCP - Lamina Pedicle Junction of C2
• LOD – 45º L-M & 45º I-S

C1 – C2 Motion
C1 – C2 Passive

C2 Passive and Manipulation

• SCP - Dorsal ridge of C2
• LOD - P – A with a scoop I – S

C2 – C3

• SCP - Lamina Pedicle Junction
• LOD – 45º L-M & 45º I-S
C2-C3 Motion

C2 - C3 Passive & Manipulation

C3 – C6

- Primarily lateral bending
- C5-C6 – Smallest amount of motion of all segments
- C5-C7 increased incidence of DJD
- SCP - Lamina Pedicle Junction
- LOD - 45° L-M & 45° I-S
C3 – C6 Motion

C3 – C6 Passive & Manipulation

C6 – T1

• Primarily lateral bending; some flexion-extension
• SCP – Lamina pedicle in front of scapula
• LOD - Slight I – S L – M (slightly above horizontal)
• Limb must be flexed
C6 – C7 Motion

C7 – T1 Motion

C6 – T1 Passive/Dynamic Manipulation
General Guidelines

• Mobilizations are best performed after warm up
• Manipulations may be performed at any time
• Passive mobilizations may be performed just prior to manipulations
• Mobilizations are performed several times per week
• Manipulations are performed at various intervals depending on fixation, improvement and use
  – Every 7-10 days up to 1-2 times per year

Manipulations

• Initial series of 3 manipulations performed at 10-14 day intervals
  – If no or minimal improvement noted after 3 manipulations then need to look elsewhere
• After 3 manipulations then increase time between manipulations
• Give a day of rest after manipulations
• Instruct owner to do active mobilizations at home between manipulations