




**PAIN MANAGEMENT
in the
CANINE PATIENT**

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**Part 7
Manual Therapies
&
Chronic Pain**

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Manual Therapies

- The Pain relieving effects of **Mobilizations** (and to a lesser extent **Traction**) can be of value in **CHRONIC** pain as well as acute pain.
- OTHER Manual Therapies
 - **Stretching**
 - **Massage**



Manual Therapies

Mobilization / Manipulation

- Manipulation = HVLAT
- Mobilization = coaxing of movement via passive rhythmical oscillations @ beginning or end of range



Manual Therapies

Mobilization / Manipulation

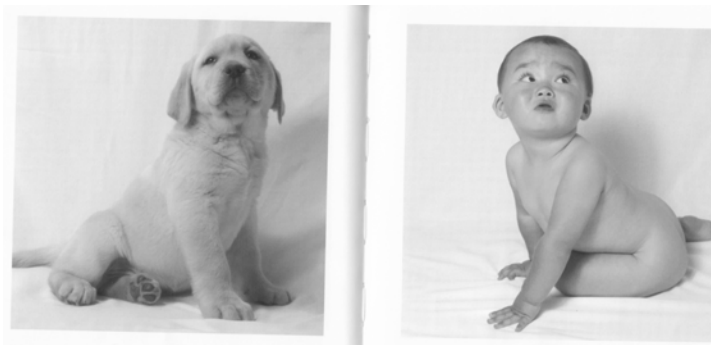
- Reasons for use:
 1. Joint stiffness
 2. Joint pain



Manual Therapies

Mobilization / Manipulation

- HOW do these affect pain & motion?
- Is there a biomechanical effect?



Manual Therapies

Mobilization / Manipulation Studies

- Range of motion studies show only transient effects of mobs/manipulation... If ANY change at all!
- The choice of technique does not seem to matter for yielding benefits from mobilizations/manipulations
- Improvement in clinical signs & symptoms can be achieved by treatment away from the painful site
 - (i.e. Thoracic spine manipulations have proven beneficial for cervical pain
 - & Lateral epicondylitis can be improved with manual treatment to the cervical spine)

Bialosky et al 2009

Manual Therapies

Mobilization / Manipulation Studies

- There is insufficient evidence to support biomechanical effects of Mobs/Manips
- But Mobs/Manips DO improve pain

So WHAT is going on???



Manual Therapies

Mobilization / Manipulation

- The neurophysiological effects of mobilizations are reportedly a reduction in acute pain and inhibition of reflex muscle contractions.



Manual Therapies

Mobilization / Manipulation

- To achieve neurophysiological effects:
 - Need repetitive (oscillatory) or sustained manual stimulation
 - RESULTS in a hysteresis effect
 - Inhibition of low threshold mechanoreceptors (group I & II) and high threshold nociceptors (group III & IV).
 - Reduction of intra-articular pressure
 - Reduction of peripheral afferent discharge

Zusman 1986; Katavich 1998; Conroy & Hayes 1998; Sterling et al 2001

Manual Therapies

Mobilization / Manipulation

- Arguments FOR Neurophysiological effects:
 - Passive cervical mobilization produces analgesia in multiple sites
 - Application of passive cervical joint mobilization influences both respiratory and cardiac function
 - Passive cervical mobilization increased pressure pain threshold locally and widespread to at least the ipsilateral forequarter (but has no effect on thermal pain threshold).

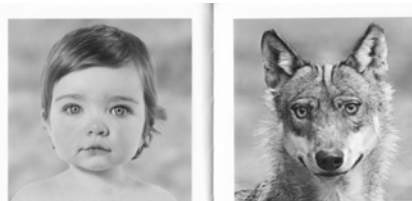


Schmid et al 2008; Bialosky et al 2009

Manual Therapies

Mobilization / Manipulation

- Arguments FOR Neurophysiological effects:
 - Spinal manual therapy yields significant improvement in visual analogue scales at rest and 24h post treatment.
 - There is high evidence that passive accessory cervical mobilization increases skin conductance in a widespread manner in both upper limbs, which lasts for several minutes post treatment



Schmid et al 2008; Bialosky et al 2009

Manual Therapies

Mobilization / Manipulation

- Neurophysiological effects:
 - One study observed an increase in blood flow in the elbow, while there was a decreased blood flow in the hand with cervical mobilizations.
 - Following *induced* perhipheral joint inflammation (capsaicin injection in rats): Joint based manual therapy has been shown by MRI to decrease activation of the dorsal horn in the spinal cord, and reduced activity of supraspinal regions responsible for central pain processing.



Schmid et al 2008; Bialosky et al 2009

Manual Therapies

Mobilization / Manipulation

- Suggested Mechanisms:
 1. Mechanical stimulus:
 - SOME biomechanical effects are associated with manual therapy as motion has been quantified with joint-biased and nerve-biased manual therapy.
 - However, finding vary in regards to biomechanical effects.
 - Subsequently, it has been suggested that:
 - “A mechanical force is necessary to initiate a chain of neurophysiological responses which produce the outcomes associated with manual therapy.”



Bialosky et al 2009

Manual Therapies

Mobilization / Manipulation

- Suggested Mechanisms:
 2. Neurophysiological mechanism:
 - There is a complex integration of both the peripheral and central nervous system responses.
 - THEY *indirectly* implicate specific mechanisms.
 - Suggested mechanisms include actions mediated by the periaqueductal gray region in the brain and mechanisms mediated by the dorsal horn of the spinal cord.



Bialosky et al 2009

Manual Therapies

Mobilization / Manipulation

- Suggested Mechanisms:
 3. Peripheral mechanisms:
 - Manual therapy may *directly* affect inflammatory mediators and peripheral nociceptors.
 - Following spinal manual therapy:
 - There is a significant reduction of blood and serum level cytokines.
 - There are changes of blood levels of happy hormones (β -endorphin, anandamide, N-palmitoyl-lethanolamide, serotonin and endogenous cannabinoids)



Bialosky et al 2009

Manual Therapies

Mobilization / Manipulation

- Suggested Mechanisms:
 4. Spinal mechanisms:
 - Manual therapy *MAY* act as a counter irritant to modulate pain and/or to “bombard the CNS with sensory input from the muscle proprioceptors”.
 - There is *indirect* evidence for a spinal cord mediated mechanism of action:
 - Manual therapy is associated with hypoalgesia, afferent discharge, motoneuron pool activity, and changes in muscle activity.



Bialosky et al 2009

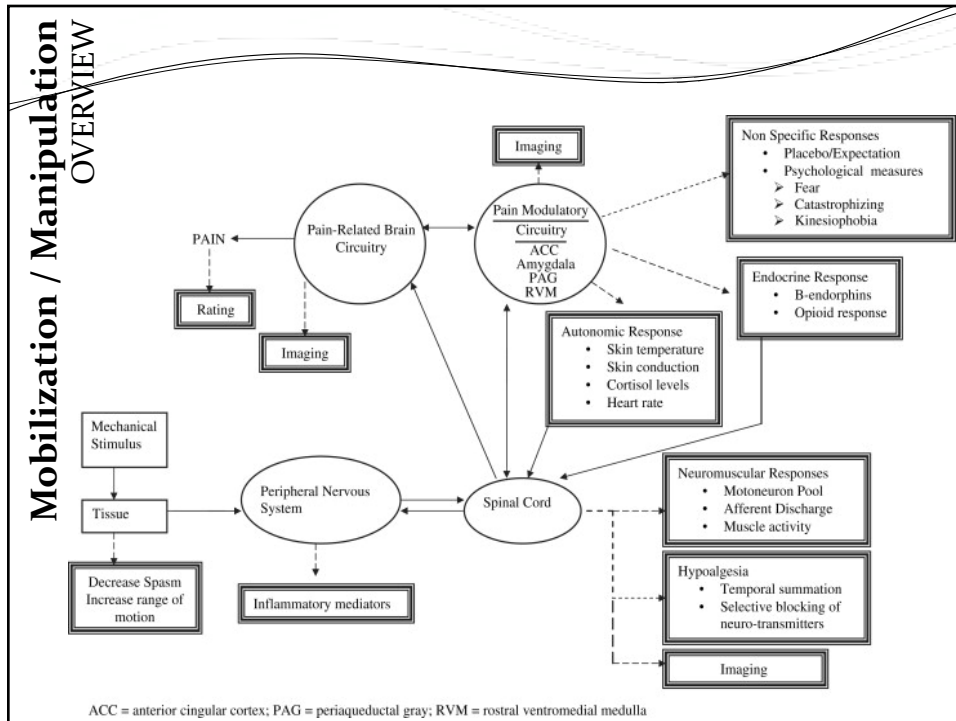
Manual Therapies

Mobilization / Manipulation

- Suggested Mechanisms:
 5. Supraspinal mechanisms:
 - (i.e. anterior cingular cortex (ACC), amygdala, periaqueductal gray (PAG), and rostral ventromedial medulla (RVM).)
 - There is *direct* support for supraspinal mechanisms for pain modulation with manual therapy (as shown on MRI).
 - There is *indirect* support for autonomic responses, and opioid responses.
 - Additionally, placebo, expectation, and psychosocial factors may be pertinent in the mechanisms of manual therapy.



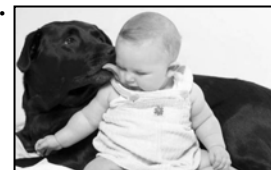
Bialosky et al 2009



Manual Therapies

Stretching and ROM

- Three weeks of stretch increases tolerance to the discomfort associated with stretch but does not change muscle extensibility in patients with chronic musculoskeletal pain.
- Stretching may increase the effectiveness of exercise in terms of functional improvement in patients with knee osteoarthritis.



Law et al 2009; Wend et al 2009

Manual Therapies

Stretching and ROM

- Stretching in association with manual therapy is effective in reducing pain and improving ROM and quality of life in chronic neck pain scenarios.
- (Note: The interesting thing about this study is that a longstanding improvement in neck ROM and pain occurred with this combined method – something that was not shown in the manual therapy-alone studies)



Cunha et al 2008

Manual Therapies

Stretching and ROM

- The use of *cold followed by static stretching* appears to be superior to other treatments in **reducing delayed muscle pain**.
- *Cold followed by some type of stretching* is more effective than treatments involving heat and stretching for **muscle relaxation**.
- *Static stretching or proprioceptive neuromuscular facilitation stretching* appear equally effective in **reducing muscle pain**.



Prentice 1982

Manual Therapies

IMPLICATION:

Stretching and ROM

- One goal for pain relief is to enhance function.
- It is plausible that simply by enhancing function, stretching can indirectly affect pain.
- So there may be a correlation and rational for the use of stretching, but it is likely that the impact is indirect.



Manual Therapies

Massage – Neurophysiological Effects

- Release of endorphins
- Reduction in pain (for as long as a regimen of therapeutic massage is continued) – after a 4 week reprieve of massage, no pain-relieving benefits remain.



Manual Therapies

Massage – *Neurophysiological Effects*

- Reduction of nausea
- Reduce heart rate
- May promote anabolic metabolism and growth



Manual Therapies

Massage – *Neurophysiological Effects*

- Reduction of blood pressure
- Increase in pain tolerance
- Can induce relaxation of muscles distal to the site being massaged



Manual Therapies

Massage – Neurophysiological Effects

- Weight gain in premature infants (and rats!)
- Optimization of digestion and promotion of nutrient assimilation



Manual Therapies

Massage – Neuropsychological Effects

- Reduction of anxiety
- Reduction of stress
- Improved mood
- Reduced depression



Manual Therapies

Massage – *Neuropsychological Effects*

- Relaxation of mind and body
- Improvement in sleep
- May have a lasting psychological anxiety reducing affect on the child whose mother was massaged while pregnant.
- May aid in quality of life in end stage palliative patients



Manual Therapies

IMPLICATION:

Massage

- May be an excellent tool for the health benefits it provides for the autonomic nervous system, endocrine system, and immune system



Manual Therapies

- Mobilization
- Stretching
- Massage



- How might you incorporate these into your pain management plan:
 - As a home program?
 - As part of your in-house therapy sessions?