CURRENT RESEARCH

OMT MECHANISMS AND BASIC SCIENCE
OMT MECHANISMS

Individual techniques are basically the same regardless of the practitioner's degree or the name that the technique is given.
PÉTRISSAGE

Pétrissage:
Deep kneading or squeezing action to express swelling.

ECOP Glossary 2009
Inhibitory influence of soleus massage onto the medial gastrocnemius H-reflex

M. Morelli, S. J. Sullivan and C. E. Chapman


Pétrissage was applied over distal soleus muscle with 1.8kPa force in distal to proximal direction. 12 subjects. Medial gastroc H-reflex (Hoffman reflex – basically an electrically induced muscle stretch reflex) markedly reduced during massage for all 12 subjects.
The Effects Of Circumferential Air-splint Pressure On Flexor Carpi Radialis H-reflex In Subjects Without Neurological Deficits

Perceptual and Motor Skills, 2006, 103, 565-579
Agostinucci, J; Holmberg, A; Mushen, M; Plisko, J; Gofman, M

Inflated a circumferential air-splint device around the flexor carpi radialis to 51-60mm Hg in 43 subjects. H-reflex increased at least 10% in 22 subjects and decreased at least 10% in 21 subjects.
Inhibitory Effects Of Circumferential Air-splint Pressure On Flexor Carpi Radialis H-reflex In Adults With Neurological Deficits

Perceptual and Motor Skills, 2010, 110, 89-103

Agostinucci, J

Inflated a circumferential air-splint device around the flexor carpi radialis to 51-60mm Hg in 22 Post CVA subjects and 5 spinal cord injury patients. H-reflex increased in 2 subjects and decreased in 14 subjects.
Manual cervical traction reduces alpha-motoneuron excitability in normal subjects

L Bradnam, L. Rochester and A. Vujnovich


Following manual cervical traction H-reflex was significantly lower than preintervention trials. Manual cervical traction, therefore, reduced the excitability of the Flexor Carpi Radialis α-motoneuron pool.

Manual cervical traction may therefore evoke an inhibitory response in the central nervous system by raising the firing threshold of individual α-motoneurons.
CERVICAL MASSAGE VS HVLA

Comparison of effects of spinal manipulation and massage on motoneuron excitability


Baseline tibial nerve H-reflex amplitudes were obtained prior to the application of either lumboscaral spinal manipulation or paralumbar and limb massage. Post-interventional H-reflex recordings were recorded immediately following the application of either modality.

Massage subjects exhibited no significant reduction in motoneuronal activity immediately following administration. Spinal manipulation produced a transient attenuation of alpha motoneuronal excitability. Paraspinal and limb massage did not inhibit the motneuron pool as measured immediately post-therapy.

Spinal manipulation procedures lead to short-term inhibitory effects on motoneuron excitability to a greater magnitude than massage.
This study investigated the association of altered lumbar vertebral mechanics (somatic dysfunction) and BMD T-score variability in subjects both with and without chronic low back pain (CLBP).

Sixty-four volunteers, ages 20 to 40, 16 CLBP - those with a self-reported history of CLBP for the past 3 months or more; 47 Non-LBP - those with no self-reported history of low back pain (LBP) in the last 3 months.

Each subject evaluated for TART by 2 physicians
<table>
<thead>
<tr>
<th>Somatic Dysfunction Assessment</th>
<th>Somatic Dysfunction, BMD T score, Mean (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Tissue Texture Abnormalities</td>
<td>0.5 (0.3-0.6)</td>
<td>0.2 (-0.3-0.7)</td>
</tr>
<tr>
<td>n</td>
<td>235</td>
<td>17</td>
</tr>
<tr>
<td>Rotational Asymmetry</td>
<td>0.5 (0.4-0.7)</td>
<td>-0.2 (-0.6-0.2)</td>
</tr>
<tr>
<td>n</td>
<td>227</td>
<td>25</td>
</tr>
<tr>
<td>Motion Restriction</td>
<td>0.6 (0.4-0.7)</td>
<td>0.1 (-0.2-0.3)</td>
</tr>
<tr>
<td>n</td>
<td>192</td>
<td>60</td>
</tr>
<tr>
<td>Tenderness</td>
<td>0.7 (0.4-0.9)</td>
<td>0.4 (0.2-0.5)</td>
</tr>
<tr>
<td>n</td>
<td>62</td>
<td>190</td>
</tr>
</tbody>
</table>

Abbreviations: BMD, bone mineral density; CI, confidence interval; n, number of vertebral segments (4 per subject) with or without particular somatic dysfunction.
TTA AND TENDERNESS

![Graph A](image1)

![Graph D](image2)

CLBP

No LBP
Rotation & AP Springing Motion

B

CLBP

No LBP
Number of positive findings is significantly related to BMD (p=0.01).

Number of positive findings is significantly related to group membership (p<0.0001).
The purpose of this study was to measure strains in the human vertebral artery (VA) during spinal manipulation of the cervical spine.

Methods: Eight piezoelectric ultrasound crystals of 0.5-mm diameter were sutured into the lumen of the left and right VA of one cadaver and monitored during ROM and HVLA.

Strains during cervical spinal manipulations were lower than those obtained during range of motion testing, suggesting that neck manipulations impart stretches on the VA that are well within the normal physiologic range of neck motion.
Students applied central and unilateral PA mobilization to C2 and C7 of one asymptomatic subject. Manual forces were measured in three directions using an instrumented treatment table. Spinal stiffness of mobilized subjects was measured at C2 and C7 using a device that applied a standard oscillating force while measuring this force and its concurrent displacement.

Higher applied force was associated with greater C7 stiffness, increased frequency of thumb pain, male gender of the student or mobilized subject, and a student being earlier in their learning process.

Lower forces were associated with greater C2 stiffness.

14 male and 14 female experience-matched chiropractors manipulated asymptomatic male adult subjects of similar height and weight. Thrust on transverse process in the vicinity of T4 and T9 with hand contact fit onto the sensor pad (area = 100 cm²).

There were no significant differences (P<.05) between male and female chiropractors for any measurements in the upper thoracic area. For the lower thoracic manipulations, the preload forces for the male chiropractors were significantly greater (P<.05) than those for the female chiropractors.
35 first-year chiropractic students were taught a motion testing technique.

- **Constant** instructor feedback resulted in the most accurate initial acquisition of the manual skill.

- **Intermittent** feedback resulted in the best retention and learning.

- Groups of students that received feedback only once during each training session demonstrated the lowest initial skills acquisition and lowest skill retention.
AACOM COUNTERSTRAIN STUDY
AACOM Counterstrain Study
AACOM COUNTERSTRAIN STUDY
Tuffier’s Line

70% Males

Reliability of Tuffier’s Line as an Anatomic Landmark. 
70% Males

70% Females

70% Males

70% Females
Tuffier’s Line

Standing Location of Tuffier's Line
Female vs. Male, $P < .0001$
Tuffier’s Line

Prone Location of Tuffier’s Line
Female vs. Male, $P = .0004$

<table>
<thead>
<tr>
<th>Location</th>
<th>Female (%)</th>
<th>Male (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L4 Body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L4 Inferior Endplate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L4-L5 Disc Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L5 Superior Endplate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L5 Body</td>
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Percent (95% CI)
OTHER SUPPORTING LITERATURE

Thirty asymptomatic volunteers were randomly divided into 2 equal groups. Each group represented either the spinous hook adjustment or lower sacroiliac adjustment. Subjects had 8 microphones taped to their skin, over the relevant facet and sacroiliac joints. Radiographic confirmation was used to ensure optimal placement of the microphones. Sound signals produced during the adjustments were digitized, recorded, and analyzed statistically.

No statistically significant correlation existed between the anatomical location of cavitation sounds and the adjustment technique selected.
Determining cavitation location during lumbar and thoracic spinal manipulation: is spinal manipulation accurate and specific?


Asymptomatic participants received SMT to either the thoracic or lumbar regions of their spine. Accelerometers were secured to the skin over the spinal column, and the relative time at which each accelerometer detected the vibration from the cavitation associated with the SMT was used to calculate the source of the vibration. The site of cavitation was then compared with the target location.

In the lumbar spine SMT was accurate about half the time. However, because most procedures were associated with multiple cavitations, in most cases, at least one cavitation emanated from the target joints. In the thoracic spine, SMT appears to be more accurate.