Integrating Movement System Impairments and Manual Therapy in assessment and treatment of the cervical spine

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Neck Pain ICF Impairment-based Classification:

- Neck pain with mobility deficits
- Neck pain with headaches
- Neck pain with radiating pain
- Neck pain with movement coordination impairments

Neck pain with mobility deficits

- ICD Diagnosis
  - Cervicalgia
  - Pain in thoracic spine

- Isolated neck pain
- Restricted cervical range of motion
- Pain provocation and mobility deficits with palpation of cervical/thoracic joints

Interventions

- Cervical mobilization/manipulation
- Thoracic mobilization/manipulation
- Stretching exercises
- Coordination, strengthening, and endurance exercises
Neck pain with headache

ICD Diagnoses:
- Headaches
- Cervicocranial syndrome

Key findings
- Headache reproduced with provocation of the involved upper cervical segments
- Restricted upper cervical segmental mobility

Key findings
- Abnormal/substandard performance on the cranial cervical flexion test
Key findings

Restrict cervical range of motion

1. Patient is supine.
2. Examiner is at head of patient.
3. Reaching symptoms are assessed.
4. Patient actively flexes neck to maximum range.
5. Examiner applies full rotational force to both sides.
6. Symptoms are measured during each motion.
7. (a) test with pain provocation and/or
(b) test if loss of 10° or greater.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotation</td>
<td>90°</td>
<td>90°</td>
</tr>
<tr>
<td>Flexion</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Neck pain with headache

Interventions
- Cervical mobilization/ manipulation
- Stretching exercises
- Coordination, strengthening, and endurance exercises

Neck pain with radiating pain

- ICD Diagnoses:
  - Spondylosis with radiculopathy
  - Cervical disc disorder with radiculopathy
Neck pain with movement coordination impairments

- ICD diagnosis:
  - Sprain and strain of cervical spine

Key Findings

- Long-standing neck pain (>12 weeks)
- Symptoms are often linked to a precipitating trauma/whiplash and may be present for an extended period of time

- Ergonomic inefficiencies with performing repetitive activities
Key findings

- Strength, endurance, and coordination deficits of the deep neck flexor muscles
  - Cranial cervical flexion test
  - Deep neck flexor endurance test

Strength, endurance and coordination deficits:
- Middle trapezius
- Lower trapezius
- Serratus anterior

Flexibility deficits of upper quarter muscles
- Anterior/middle/posterior scalenes
- Upper trapezius
- Levator scapulae
- Pectoralis minor
- Pectoralis major
Sound familiar?

Janda (1987, 1988)

Upper Crossed Syndrome

Interventions

- Patient education and counseling
- Coordination, strengthening, and endurance exercise
- Stretching exercise

Neck Pain ICF Impairment-based Classification:
Is it fair to say:

- Faulty alignment
- Incoordinated movements
- Weakness of stabilizing muscles
- Over lengthened or short muscles

Contribute

Neck Pain with Mobility Deficits

Neck Pain with Movement Coordination Impairments
Evidence for Manual Physical Therapy Management of Cervical Spine Disorders

- Neck pain with mobility deficits/Hypomobility
- Neck pain with movement coordination impairments/Instability
- Neck pain with headache/Cervicogenic Headache
- Neck pain with movement coordination impairments/Acute pain/Whiplash
- Neck pain with radiating arm pain/Radiculopathy

Neck Pain with Mobility Deficits/Hypomobility

The Effectiveness of Manual Physical Therapy and Exercise for Mechanical Neck Pain
A Randomized Clinical Trial

94 patients referred to PT for mechanical neck pain with or without unilateral UE symptoms (3 Military PT clinics)

Randomization

Manual Therapy and Exercise (n=47)

Minimal approach of placebo US, advice, and motion exercise (n=47)
Manual Physical Therapy and Exercise

- Examination
  - Tests and measures: ROM, PIVM tests for mobility and pain provocation, upper quarter neuro screen, special tests for cervical impairments

- Evaluation
  - "Interventions specifically targeted to impairments identified during the Physical Examination"

- Interventions
  - Thrust and non-thrust manipulation
  - Exercises to target specific impairments such as deep neck flexor strengthening
  - Both groups received 6 treatment sessions over a 3 week period (2x/week)

Neck Disability Index (0-50)

Visual Analog Scale (0-100) for Cervical Pain Scores
Conclusion from Walker et al.

• An “impairment-based” Manual Physical Therapy approach resulted in clinically and statistically significant short- and long-term improvements in pain, disability, and patient perceived recovery when compared to a program of advice, motion exercises, and sub therapeutic ultrasound.

Impairment-based Approach

- Assess spinal segmental and direction of hypomobility or hypermobility
- Reproduce pain and address reactivity
- Assess strength and neuromuscular control
- Specific manipulation to address hypomobility impairments and pain
- Specific exercise to address weakness, instability, and neuromuscular control
- Integrate manipulation with Exercise
CPR for benefit of thrust manipulation of cervical spine

- Symptom duration of less than 38 days
- Positive expectation that manipulation will help
- Side to side difference of cervical rotation of 10 degrees or more
- Pain with P/A testing mid cervical spine
Factors impacting increased likelihood of adverse reactions

History of neck trauma
Pain less than 1 year
Worsening of pain since onset
Pain ratings of 8+ on a 0-10 scale
NDI scores 16 or more
Moderate or severe headache
Nausea during the past month
Lack of confidence in the treatment

Hurvitz J Manip Phys Ther 2004

Development of a Clinical Prediction Rule for Guiding Treatment of a Subgroup of Patients With Neck Pain: Use of Thoracic Spine Manipulation, Exercise, and Patient Education

Joshua A. Cielak, John D Childs, Julie M Fritz, Julie M Whitman, Sarah L Ebnerhart

Physical Therapy

January 2007

Research Report

ORTHOPAEDIC SECTION

ORTHOPAEDIC SECTION
Examination of a Clinical Prediction Rule to Identify Patients with Neck Pain Likely to Benefit from Thoracic Spine Thrust Manipulation and a General Cervical ROM Exercise: Multi-Center Randomized Clinical Trial


Manipulation + Exercise

Exercise only

2x/week x 1 wk
1x/wk x 3 wks

2x/week x 1 wk
1x/wk x 3 wks

Sessions 1 & 2 included 3 thoracic thrust mnp (TJM) techniques & neck AROM ex
Sessions 3-5 were same as exercise only group

Each session included manual stretching of neck and scapular muscles and strengthening exs for DNF and parascapular muscles

Success rates across time for each group. Success defined as scoring +5 or greater on GRoC scale. Asterisk indicates statistically significant difference between groups.
Conclusions

• The results of the current study did not support the validity of the previously developed CPR

• 2-way interaction between group and time suggests that patients with mechanical neck pain who do not exhibit any contraindications to manipulation exhibit statistically significant improvements in disability in both the short- and long-term follow-up periods with thoracic TJM


64 Patients with Mechanical Neck Pain

Non thrust cervical MNP + Exercise x 2 treatment sessions

Non thrust cervical MNP + Thoracic Thrust MNP x 2 treatment sessions

At 1 week: Combination of thoracic spine thrust manipulation + cervical spine nonthrust manipulation had better improvements in pain, disability, and global ratings of change

Supine Mid-Thoracic Rotation Thrust Manipulation

Supine mid-thoracic rotation thrust
Impairment-Based Manual Physical Therapy Approach

- **Manipulate targeted Hypomobile Cervical and Thoracic Segments**
- **Therapeutic Exercise**
  - ROM
  - Motor re-training/
    strengthening/
    Neuromuscular control
- **Postural and ergonomic education**

Neck Pain with Movement Coordination Impairments/ Cervical Instability

Delphi Survey for Symptoms of Cervical Spine Instability

- Intolerance to prolonged static postures
- Fatigue and inability to hold head up
- Better with external support
- Frequent need for self-manipulation
- Feeling of instability, shaking, or lack of control
- Frequent episodes of acute attacks
- Sharp pain with sudden movements

Delphi Survey for Exam findings of Cervical Spine Instability

- Poor coordination/neuromuscular control including poor recruitment and dissociation of cervical segments with movement
- Abnormal joint play
- Motion that is not smooth throughout range of motion including segmental hinging, pivoting, and fulcruming
- Aberrant movement


Cranio-cervical Flexion test

- Head nod in 5 incremental stages of increasing range and hold 10 seconds
- Inferior performance has been noted in patients with neck pain and whiplash


Deep Neck Extensor Training

Impairment-Based Manual Physical Therapy Approach – Movement Coordination Impairments

- Manipulate targeted hypomobile segments above and below region of instability
- Therapeutic Exercise
  - Motor re-training/
  - strengthening/
  - Neuromuscular control
- Postural and ergonomic education

Neck pain with headache/ Cervicogenic Headache

Cervicogenic headache

- Unilateral headache with onset preceded by neck pain
- Headache pain triggered by neck movement or positions
- Headache pain elicited by pressure on posterior neck especially at one of the 3 upper cervical joints (Jull, 2002)
Flexion-Rotation Test

A Randomized Controlled Trial of Exercise and Manipulative Therapy for Cervicogenic Headache
Gwendolen Jull, PT, PhD,* Patricia Trott, PT, MSc,* Helen Potter, PT, et al.

200 patients with Cervicogenic headache

Random assignment

Manual Therapy  Exercise  Combined manual therapy and exercise  Control

Manual Therapy interventions
• 8-12 treatment sessions with a physical therapist over a 6 week treatment period
• PTs vary treatments based on examination and re-examinations of the patients in the treatment groups.
Results

- Beneficial effects were found for headache frequency and intensity and neck pain and disability for both manual therapy and exercise used alone and in combination at both 7 weeks and 12 months follow up.

- Ten percent more of the participants receiving the combined therapy obtained good and excellent results lending support for the combined use of specific therapeutic exercise and manual therapy to treat patients with cervicogenic headaches.
Conclusion

• Jull’s study illustrates the effectiveness of an impairment based manual physical therapy approach that combines manual therapy and exercise for treatment of patients with cervicogenic headache.

Craniovertebral Rotation Isometric Manipulation

Craniovertebral rotation isometric manipulation in supine

Craniovertebral Distraction with C2 Stabilization

Craniovertebral distraction with C2 stabilization
Impairment-Based Manual Physical Therapy Approach – Cervicogenic H/A

- Manipulate targeted hypomobile segments
  - Target Craviovertebral mobility deficits
- Therapeutic Exercise
  - Motor re-training/strengthening/Neuromuscular control
- Postural and ergonomic education

Whiplash Associated Disorders: Neck pain with movement coordination impairments/Acute pain/Whiplash

Prognostic Factors of poor outcomes from WAD

- Higher NDI(>30)
- High pain scores
- Older age
- Cold hyperalgesia
- Pressure Pain Threshold
- Post traumatic stress
- Kinesiophobia
- Greater decreased ROM
- Poor tolerance to Exam

- Sterling, Pain, 2005 and 2006

Sensory change Assessment

Cold Pain Threshold
Pressure Pain threshold

Does the presence of sensory hypersensitivity influence outcomes of physical rehabilitation for chronic whiplash?—A preliminary RCT
G Jull, PT, PhD, M. Sterling, J Kenardy, E. Beller

71 patients with chronic WAD II
Random assignment
Manual Physical Therapy (n=36) Self Management Program (n=33)

Manual Physical Therapy
Non-thrust manipulation- low load to avoid provocation of symptoms
DNF and scapular exercises
Self Management Program

- Education Booklet
  - Assurance of recovery
  - Encouraged to stay active
- Ergonomic advice (similar to MPT)
- Home Exercise program 2x/day (similar to MPT)

Results

- MPT can reduce pain and disability in chronic WAD
- Change in DNF control improved with MPT
- 72.5% had sensory changes at baseline
- Subgroup with both widespread mechanical and cold hyperalgesia had the least improvement

Impairment-Based Manual Physical Therapy Approach - Whiplash

- Manipulate targeted hypomobile/Reactive segments – gentle nonthrust
- Therapeutic Exercise
  - Motor re-training/strengthening/Neuromuscular control/non-provocative
- Postural and ergonomic education
Neck pain with Radiating Arm Pain/Cervical Radiculopathy

Mechanical traction for neck pain with or without radiculopathy

- **Main results**
  Of the seven selected RCTs (total participants = 888), only one (N = 100) had a low risk of bias. It found no statistically significant difference (SMD -0.16; 95% CI: -0.59 to 0.27) between continuous traction and placebo traction in reducing pain or improving.

- **No evidence from RCTs with a low potential for bias that clearly supports or refutes the use of either continuous or intermittent traction for neck disorders.**


Signs of cervical radiculopathy

- Limited Cervical AROM (<60°)
- + Neck Distraction Test
- + Spurling A test
- + ULND 1

Predictors of Short-Term Outcome in People With a Clinical Diagnosis of Cervical Radiculopathy

96 consecutive patients referred for physical therapy for cervical radiculopathy
Baseline History & Physical Examination completed
9 Physical Therapists provided interventions based on Exam findings

Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Post-test probability of success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (&lt;54 y)</td>
<td>62.9</td>
</tr>
<tr>
<td>Dominant arm is not affected</td>
<td>62.9</td>
</tr>
<tr>
<td>Looking down does not worsen symptoms</td>
<td>59.5</td>
</tr>
<tr>
<td>Multimodal treatment including manual therapy, cervical traction, and deep neck flexor muscle strengthening for at least 50% of visits</td>
<td>71.3</td>
</tr>
</tbody>
</table>

The probability of success was calculated as positive likelihood ratios and assumed a pretest probability of 53%.

Manual Therapy, Exercise, and Traction for Patients With Cervical Radiculopathy: A Randomized Clinical Trial
Ian A. Young, Lori A. Michener, Joshua A. Cleland, Arnold J. Aguilera, Alison R. Snyder

81 patients with Cervical Radiculopathy (3/4 CPR)
M/T, Exercise, and Intermittent traction (50on/10off) 2x/wk x 4wks
M/T, Exercise, and Sham Traction (5/6) 2x/wk x 4wks

Significant improvements noted in both groups at 2 and 4 week follow up for NDI, NPRS, and PSFS; NO significant differences noted between the two groups.
Fritz JM, Thackeray A, Brennan GP, Childs JD. Exercise only, exercise with mechanical traction, or exercise with over-door traction for patients with cervical radiculopathy, with or without consideration of status on a previously described subgrouping rule: A randomized clinical trial. JOSPT. 2014; 44(2): 45-57

86 patients with neck pain with radiating arm pain

Exercise only  Exercise plus mechanical traction  Exercise plus over-the-door home traction

At 6 months and 12 months, the Exercise plus Mechanical Traction group had lower levels of disability (NDI scores)

Impairment-Based Manual Physical Therapy Approach - Radiculopathy

- Manipulate targeted hypomobile segments - Cervical and Thoracic
- Therapeutic Exercise – Motor re-training/ strengthening/ Neuromuscular control
- Cervical Traction
- ULND glides
- Postural and ergonomic education
Movement Systems Impairment

What is the underlying cause of musculoskeletal pain?

Anterior knee pain
What pathological diagnosis?
Patellofemoral pain

Movement Systems Impairments
- Developed by Dr. Shirley Sahrmann
- Faulty movements and alignments contribute to musculoskeletal pain
- Diagnosis is made of the faulty alignment or movement
Movement system impairment diagnosis?

Femoral adduction internal rotation

Diagnosing the causative movement impairment/posture....

Leads to correction of the impairment...
Movement Systems Impairments

- Cervical Spine:
  - (Faulty) Extension*
  - (Faulty) Rotation*
  - (Faulty) Flexion

Faulty extension
Faulty rotation

Movement Systems Impairments

- Scapular
  - Insufficient elevation
  - Insufficient upward rotation
- Abduction
- Winging
- Tipping

Movement Systems Impairments

- Thoracic Spine
  - (Faulty) Flexion
  - (Faulty) Extension

4/29/14
Evidence based impairments related to neck pain

- Posture and alignment
- Impaired cervical musculature
- Scapular contribution to neck pain
- Shoulder elevation contribution to neck pain

Impaired posture and alignment

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Manual Therapy

The relationship between head posture and severity and disability of patients with neck pain

Chris Ho Ting Yip¹, Thomas Tai Wing Chiu²*, Anthony Tung Kuen Poont

62 subjects with neck pain
52 controls without neck pain

Line from spinous process of C7 through the tragus of the ear
Horizontal line through C7

Fig. 1. The measured CV angle.

Intra-rater reliability
ICC=0.98
MDC=3.61°

“Subjects with neck pain revealed a significant forward head posture compared to those without neck pain”

Smaller CV angle = More head forward
Neck pain group= 49.93°

Larger CV angle = Less head forward
Control group= 55.02°
A negative correlation existed between CV angle and pain/disability

<table>
<thead>
<tr>
<th>CV angle</th>
<th>Duration of neck pain</th>
<th>NPIQ</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.45°</td>
<td>0.68</td>
<td>0.03</td>
<td>0.86</td>
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<tr>
<td>0.62</td>
<td>0.005</td>
<td>0.053</td>
<td>0.005</td>
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<tr>
<td>0.86</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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<tr>
<td>0.81</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>0.95</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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<tr>
<td>1.05</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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<tr>
<td>1.18</td>
<td>0.005</td>
<td>0.005</td>
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<td>1.30</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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<td>1.42</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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<tr>
<td>1.54</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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<tr>
<td>1.66</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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<tr>
<td>2.05</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
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</tbody>
</table>

CV angle, uncorrected angle; NPIQ, Neck Pain Index Questionnaire; NPIQ, Nuisance Pain Index Score; r, coefficient of determination.

*Correlation is significant at the 0.05 level (2-tailed).

Relationships between sagittal postures of thoracic and cervical spine, presence of neck pain, neck pain severity and disability

Kwok Tung Lai, Ka Yuen Chong, Kwok Bun Chan, Man Fung Chee, King Yuen Lo, Thomas Tai Wing Chiu

Neck pain patients tended to have greater upper thoracic flexion and head forward postures.

- Neck pain subjects showed more upper thoracic angle (7.34°) than controls.
- Positively correlated with neck pain.

People with greater upper thoracic angle may be more likely to develop neck pain.

- Hanten et al. (1991)
  - Extended upper cervical spine and protracted shoulder girdles related to increased kyphosis.

- Falla et al. (2007) and Straker et al. (2008):
  - Flexion of the whole spine increased EMG activity in cervical erector spinae - increasing pressure on the posterior structures.
Impaired cervical musculature

Muscle Dysfunction in Cervical Spine Pain: Implications for Assessment and Management

“irrefutable evidence of an association between mechanical neck pain and dysfunction of the muscles of the cervical spine”


Changes in physical structure

Elliot (2006)

- Cross-sectional area
- Fatty infiltration
- Fiber type
Changes in behavior

- Timing
- Activation level
- Endurance


Heightened co-activation of superficial flexors and extensors

- Loss of well defined preferred directions of muscle action

“Greater co-activation ... may result in excessive compressive loads on the cervical facet joints...” Fernández-de-las-Peñas

Inability to relax - repetitive upper extremity movements

- Superficial cervical flexors
- Upper trapezius
Alterations in motor control

Delayed activation of cervical musculature with arm movements

Effect of Neck Exercise on Sitting Posture in Patients With Chronic Neck Pain

Deborah Falla, Gwendolen Juli, Trevor Russell, Bill Vicenzino, Paul Hodges

*Phys Ther.* 2007;87:408–417
Questions:
- Do people with neck pain demonstrate differences in ability to maintain upright posture when distracted
- Compare effects of low-load craniocervical flexion training vs. conventional neck flexor endurance-strength training

Methods
- Change in cervical and thoracic posture measured at 2 min intervals
- Total time: 10 minutes
Progressive increase in change of cervical angle in neck pain group
Progressive increase in change of thoracic angle in neck pain group

Craniocervical flexion activates deep cervical musculature which have a relatively high density of muscle spindles...improved kinesthetic sense...

CCF training group showed a significant decrease in change of cervical angle during task

• Both training groups demonstrated improved ability to maintain thoracic angle and reduction in pain/disability
**Clinical integration:**

- Observation: Posture and active movements
- Engage the deep neck flexors, correct head forward posture
- Reassess active movements and symptoms
- Correction of thoracic kyphosis with reassessment of symptomatic movement

**Upper extremity use and it's connection to neck pain...**
Survey of 22,000 working-aged adults

- Some evidence for occupational influence on neck disorders
- Excess of neck pain in male construction workers
- Disabling neck pain in female nurses

Table 4: Risk of neck pain by occupational activity. OR = prevalence ratio; 95% CI = 95% confidence interval; +ve = positive for prevalence

<table>
<thead>
<tr>
<th>Occupational activity</th>
<th>Past week</th>
<th>Past year</th>
<th>Promising activity in past year</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>%-est</td>
<td>%-est</td>
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<tr>
<td></td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
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<td></td>
<td></td>
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<tr>
<td>Manual workers:</td>
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<tr>
<td>Light work</td>
<td>31.4</td>
<td>26.8</td>
<td>22.4</td>
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<tr>
<td>Medium work</td>
<td>28.4</td>
<td>21.6</td>
<td>17.9</td>
</tr>
<tr>
<td>Heavy work</td>
<td>32.7</td>
<td>26.6</td>
<td>22.3</td>
</tr>
<tr>
<td>Work with hands above shoulder height &gt; 1 hour</td>
<td>36.2</td>
<td>30.5</td>
<td>25.9</td>
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<tr>
<td>Key workers:</td>
<td></td>
<td></td>
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<tr>
<td>Occupational exposure to head arm vibration</td>
<td>9.2</td>
<td>4.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Occupational exposure to whole body vibration</td>
<td>9.9</td>
<td>4.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Nurses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light work</td>
<td>32.6</td>
<td>27.8</td>
<td>23.8</td>
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<tr>
<td>Medium work</td>
<td>29.4</td>
<td>24.1</td>
<td>20.3</td>
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<tr>
<td>Heavy work</td>
<td>33.8</td>
<td>29.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Work with hands above shoulder height &gt; 1 hour</td>
<td>38.7</td>
<td>33.5</td>
<td>29.4</td>
</tr>
</tbody>
</table>

- Association with work that involved using hands above shoulder height > 1 hour

doi:10.5271/sjweh.586
• 22 pain free subjects
• Kinematic MRI at 0, 30, 60, 90, 120 degrees of abduction

- Passive shoulder abduction has no effect
- Isometric shoulder abduction up to 90 degrees induces left rotation throughout spine
- Largest movement at C6

Cervical Rotation Movement Fault

U/L shoulder Flexion:
- Lower Cervical rotation
Unilateral shoulder flexion- excess cervical mobility assessment

Scapular impairment contributions to neck pain
Sample Size

- 46 patients
- 30 women
- 16 men
- Long standing history of neck pain
- Moderate symptoms and disability

Methods

- Symptom report
- Range of motion
- A) Patient preferred posture
- B) Scapulae elevated posture

The Immediate Effect of Passive Scapular Elevation on Symptoms With Active Neck Rotation in Patients With Neck Pain

Linda R. Van Dillen, PT, PhD*; Mary Kate McDonough, PT, DPT, OCS**
Thomas M. Sisco, MEd, DPT, ATC; and Shirley A. Sakmann, PT, PhD, FAPTA*

(Clin J Pain 2007;23:641–647)
Patient preferred posture

- 29/46 (63%) reported increase in symptoms with neck rotation in patient preferred posture

Elevated scapulae

- A decrease in symptoms in right rotation (82%)
- A decrease in symptoms in left rotation (76%)

Conclusion

- Elevation of scapulae
- Improved rotation
- Reduced symptoms
Proposed mechanisms

1. Decreased load (and weight of arms) on cervicoscapular muscles, removes passive stretch
   - Removes passive limitation to rotation
   - From short or stiff trapezius or levator scapulae

2. Elevation decreased active tension in levator scap and upper trapezius
   - Schuldt et al. (1987) showed decreased EMG activity with elbows supported in work activities

3. Elevation may decrease stretch on brachial plexus with head rotation
Clinical integration:
- Observation of shoulder girdle posture
- Observation of cervical movement with shoulder elevation
- Presence of radiating symptoms
- Presence of symptoms in the upper trapezius or levator scapulae
- Correction of impairments with reassessment of functional movement

• Assess effects of shoulder unloading on active movement and symptoms

Lab Case 1:
Integrated examination:

- Posture/correction
- Determine contribution of faults to pain syndrome
- Active cervical ROM and correction
- Deep neck flexor engagement in functional motion
- Deep neck flexor endurance or craniovertebral flexion test
- Scapular unloading
- PAIVM and PPIVM examination of cervical spine

Craniovertebral Rotation Isometric Manipulation in supine

Craniovertebral Distraction with C2 Stabilization