Thrust Joint Manipulation for the Cervical Spine: New Thoughts on Benefits and Risks

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Incidence of Neck Pain
- 54% of individuals have experienced neck pain within last 6 months (Cote et al., 2008)
- Economic burden of neck pain is 2nd only to LBP
- Prevalence of neck pain between 9.5% - 35% (Hogg-Johnson et al., 2008)
- 50% have symptoms that persist for greater than 12 months (Cote et al., 2008)
- 50-85% experience recurrence of their neck pain within 1 – 5 yrs (Haldeman et al., 2008)
- 44% of patients with neck pain will develop chronic symptoms (Hurwitz et al., 2008)

How do we treat neck pain?

Classification Approach

Neck Pain Sub-groups
- Mobility
  - Manual therapy and exercise
- Centralization
  - Activities to promote centralization
- Exercise/Conditioning
  - Conditioning/strengthening exercises
  - Manual therapy and deep neck flexor/scapular strengthening
- Headaches
  - Gentle ROM and activity
- Pain Control

What is “manual therapy”? A ‘hands on’ approach to patient care?
Manipulation defined:

Should PTs use C Spine Manipulation in their clinical practice?

Did you learn C Spine Manipulation in your entry-level PT program?

• Isn’t it something that PTs have only just started to provide in clinical practice?
• Isn’t it dangerous?
• Can’t we do the same thing with mobilizations?

Today’s plan

1. How effective can TJM to the C spine be?
2. How much of a risk are we taking with TJM to the C spine?
3. What are we teaching entry-level DPT students about this?
Examination Items Predicting SUCCESS

- **HISTORY**
  - Duration of symptoms 30 days or less
  - Symptoms not distal to the shoulder
  - Looking up does not aggravate symptoms
  - FABQPA < 11

- **PHYSICAL EXAM**
  - Decreased upper thoracic (T3- T5) kyphosis
  - Cervical extension ROM < 30

**Objective:**
To validate a clinical prediction rule to identify individuals with back pain most likely to benefit from thoracic manipulation and exercise.

**Study Design:**
A randomized clinical trial.
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No significant interaction for NDI scores (p=.79)
Outcomes over time were not dependent upon combination of patient’s treatment group and status on the rule

Results show that combination of manipulation + exercise was more effective in decreasing disability regardless of status on the CPR

Validation of the Rule
- Study failed to validate the CPR for neck pain responding to T spine manipulation
- Using the rule does not improve patient care
- Patients with neck pain and no contraindications to manipulation should receive T spine manipulation regardless of clinical presentation

In the case of neck pain + or – on the CPR for T spine manipulation... NO!
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**Study Objective**

- Patient w/ Acute NP
- Meet CPR for T Spine TJM
- Meet CPR for T Spine TJM

1. Symptoms < 30 days
2. No symptoms distal to shoulder
3. Looking up – no aggravates
4. Low FABQ-PA (< 12)
5. Decreased kyphosis @ T3 – T5
6. Ext ROM > 30 degrees

**Baseline**
- Thoracic Group
  - Visits 1 & 2
- Cervical Group
  - Visits 1 & 2

**Thoracic Group – Visits 1 & 2**

**Cervical Group – Visits 1 & 2**

**The C Spine Manipulation**
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Both Groups – Visits 3 – 5

Outcome Measures

- Neck Disability Index (NDI) – 0 – 50
  - MDC 5/50 and MCID 7/50
- Numeric Pain Rating Scale (NPRS) – 0 – 10
  - MDC 2.1 and MCID 1.3
- Fear-Avoidance Beliefs Questionnaire (FABQ)
  - Physical Activity Subscale – 0 – 24
  - Work Subscale – 0 – 42
- Global Rating of Change Scale (GROC)
  - MCID 3-point change from baseline

TABLE 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Thoracic Group (n = 15)</th>
<th>Cervical Group (n = 14)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>32.4 ± 5.8</td>
<td>33.0 ± 13</td>
<td>.723</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>6 (40%)</td>
<td>10 (71%)</td>
<td>.379</td>
</tr>
<tr>
<td>Symptom duration (d)</td>
<td>15.8 ± 9.3</td>
<td>11.3 ± 7.9</td>
<td>.044</td>
</tr>
<tr>
<td>Pain location (unilateral)</td>
<td>5 (67%)</td>
<td>9 (69%)</td>
<td>.940</td>
</tr>
<tr>
<td>Cervical extension ROM (°)</td>
<td>26.5 ± 6.4</td>
<td>26.6 ± 4.3</td>
<td>.862</td>
</tr>
<tr>
<td>FAQ-PA (0-36)</td>
<td>13 ± 6.0</td>
<td>15 ± 4.3</td>
<td>.267</td>
</tr>
<tr>
<td>FAQ-PA (0-42)</td>
<td>34 ± 26</td>
<td>52 ± 28</td>
<td>.227</td>
</tr>
</tbody>
</table>

Abbreviations: FABQ-PA, Fear-Avoidance Beliefs Questionnaire physical activity subscale; FAQ-W, Fear-Avoidance Beliefs Questionnaire work subscale; ROM, range of motion.

1Values are means ± SD and n (%) 2Independent t test.
3Fisher exact test.
4P values are chi-square.

NDI

NPRS

FABQ-PA

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**GROC**

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Thoracic Group</th>
<th>Cervical Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment 2</td>
<td>0/10</td>
<td>13/14</td>
</tr>
<tr>
<td>1-week</td>
<td>2/10</td>
<td>14/14</td>
</tr>
<tr>
<td>4-weeks</td>
<td>2/10</td>
<td>14/14</td>
</tr>
<tr>
<td>6-months</td>
<td>2/10</td>
<td>14/14</td>
</tr>
</tbody>
</table>

Number of patients who reported GROC of at least +5 from baseline.

**Key Points**

- **Adverse reactions associated with the TJM?**
  - Defined as sequelae that were:
    - medium to long term in duration
    - moderate to severe symptoms
    - serious, distressing, and unacceptable to the patient
  - *None observed in this study*

- **Side effects associated with the TJM?**
  - Defined as:
    - Short term, mild in nature, non-serious, transient, and reversible, e.g., increased neck pain, headache, and fatigue
  - 1/14 in C Spine group (after 1st Tx)
  - 8/10 in T Spine group (after 1st Tx)

- **Findings**
  - Patients treated with combination of C spine TJM and ex showed significantly greater improvement in pain and disability compared to those treated with T spine TJM and ex
  - They also experienced fewer transient post-treatment side effects

- **Implication**
  - CPR for T Spine TJM and ex in patients with neck pain may actually be helpful in identifying patients who are likely to benefit from C spine TJM
  - This needs to be formally tested

- **Caution**
  - Several factors limit generalizability of this study include:
    - small sample size
    - all patients had acute neck pain (< 30 days)
    - all interventions provided by 1 physical therapist

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Safety of cervical spine manipulation: are adverse events preventable and are manipulations being performed appropriately? A review of case reports

Submitted for publication

Emilio J. Puentedura, PT, DPT, GDMT, OCS, FAAOMPT
Jessica March, PT, DPT
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Amber Perez, PT, DPT
Merrill R. Landers, DPT, OCS
Harvey W. Wallmann, PT, DSc, LAT, ATC, CSCS
Joshua A. Cleland, PT, PhD, OCS, FAAOMPT

Methods

• Case reports published in peer reviewed journals involving adverse events following CSM
• Search engines including PubMed and Cumulative Index to Nursing and Allied Health (CINHAL)
• Case reports published between 1950 and 2010

Excluded articles

• Adverse events occurred without CSM (spontaneous)
• Systematic or literature review
• Written in language we couldn’t translate, i.e. other than English, German, Spanish, Polish, French or Norwegian
Results

- 134 cases reported in 93 articles
- Language translation required in 9% of cases
- 73 males and 61 females
- Average age of patient 43.8 (± 11.8) years
- 51.5% of injuries were severe and irreversible
- 41% of injuries were severe and reversible
- 2.2% were transient (5.2% unknown)

Conclusions

- If all contraindications and red flags were ruled out, there was potential for a clinician to prevent 44.8% of adverse events associated with CSM
- 10.4% of events were unpreventable, suggesting some inherent risk associated with CSM even after a thorough exam and proper clinical reasoning
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Take Home Message
- By performing a thorough examination and using sound clinical reasoning, clinicians may be able to prevent a majority of adverse events
- Use your skills to further reduce risks associated with CSM and you can improve patient safety

We have a terminology problem
- Thrust-joint manipulation
- Grade V Mobilization
- High-velocity/low amplitude
- Articulation
- Can we even understand each other?

In the end...
Will our students use manipulation?
From academia to the clinic.

Background

Mounting supportive evidence

Are Students Receiving the Education?
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Why not teach joint manipulation?

- Not considered entry level skill: 45%
- Lack of time: 26%
- Lack of qualified faculty: 7%
- Perceived lack of evidence: 7%

Clinical Instructors reported not using joint manipulation: 54%
Clinical Instructors did not teach joint manipulation to students: 70%
Not considered an entry level skill: 58%
Lack of qualified staff: 53%
Liability concerns: 46%
Students not being academically prepared: 41%
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Asked academic coordinators:
- “What would be the most beneficial way to increase their graduates’ preparation in joint manipulation?”
- 70% stated that there needs to be an “increased emphasis on manipulation in clinical affiliations.”

“Nothing will impede our progress toward Vision 2020 more than a group of students having evidence-based practice inadequately modeled in clinical settings.”

Methods

Students in their final year of entry level education or within 3 months after graduating

Respondents

460 respondents
38 states

It’s Not 2005

Female
Want to practice outpatient orthopedics
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Respondents

- AAMPT members
- APTA members

Are we making progress?

Results

95%

- received academic training in performing joint manipulation

Why less than half of students?!?!

<table>
<thead>
<tr>
<th>Response</th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student didn’t ask or discuss why!</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Limited availability of trained staff</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Liability concerns</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Not considered (by CI) entry level skill</td>
<td>14%</td>
<td></td>
</tr>
</tbody>
</table>

Sounds familiar...Is this progress?

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not considered an entry level skill</td>
<td>57 %</td>
<td>14 %</td>
</tr>
<tr>
<td>Lack of qualified staff</td>
<td>53 %</td>
<td>25 %</td>
</tr>
<tr>
<td>Liability concerns</td>
<td>46 %</td>
<td>20 %</td>
</tr>
</tbody>
</table>

Boissonnault and Bryan, JOSPT 2005
28% cited other barriers...

My CI did not use manipulation

My CI was not comfortable performing manipulations
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A chiropractor was always on-site to perform manipulation...

• Of the students who could use manipulation...

67%

• chose not to perform joint manipulation when clinically indicated (CPR, clinical reasoning, etc...)

WHY?

Why not perform joint manipulation?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of confidence</td>
<td>55%</td>
</tr>
<tr>
<td>Personal skill level</td>
<td>48%</td>
</tr>
<tr>
<td>Patient safety concerns</td>
<td>28%</td>
</tr>
<tr>
<td>Not feeling academically prepared</td>
<td>26%</td>
</tr>
<tr>
<td>Lack of staff for feedback</td>
<td>22%</td>
</tr>
</tbody>
</table>

Other findings

• If the CI used manipulation
  – 87.5% of students felt manipulation should be an entry level skill
  – 88.8% practiced manipulation in the clinic
  – 79.7% used manipulation on patients
• If the CI did NOT use manipulation
  – Only 59.5% believed it was an entry-level skill
  – Only 17.6% practiced manipulation in the clinic
  – Only 12.1% were allowed to use manipulation
"An overwhelming reliance by clinical physiotherapists on formal education (clinical and academic) as a basis for practice"

"Clearly demonstrates a responsibility of the education establishment"

Academic Faculty
- Reach out
- Teach
- Create

Clinical Faculty
- Reach out
- Be open
- Learn

Prepared Students
- Education is变革
- Education is Change

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Questions?

Thank You

- Joshua Cleland, Franklin Pierce University
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- Peter Huijbregts, In memorium
- University of Nevada, Las Vegas
- University of Colorado, Denver

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