

Spinal Manipulation for Shoulder Pain: Who is Likely to Respond?



Schoudernetwerk Nederland
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Thoracic Manipulation and Shoulder Pain



- Generally, systematic reviews supports short & long-term benefits of spinal manipulation alone or in combination ^{1,2,3,4}
 - Non-specific shoulder pain
 - Rotator cuff disease / Subacromial pain syndrome
- **BUT**
 - Treatment effects are small
 - Comparative treatments are likely just as effective
 - Inconsistent findings – mixed group of responders

1 Roy JS, et al, 2015

2 Bizzarri P, et al, 2017

3 Haik M, et al, 2016

4 Peek A, et al, 2015



Paradigm of How Manipulation Works



Manipulation



Mechanism



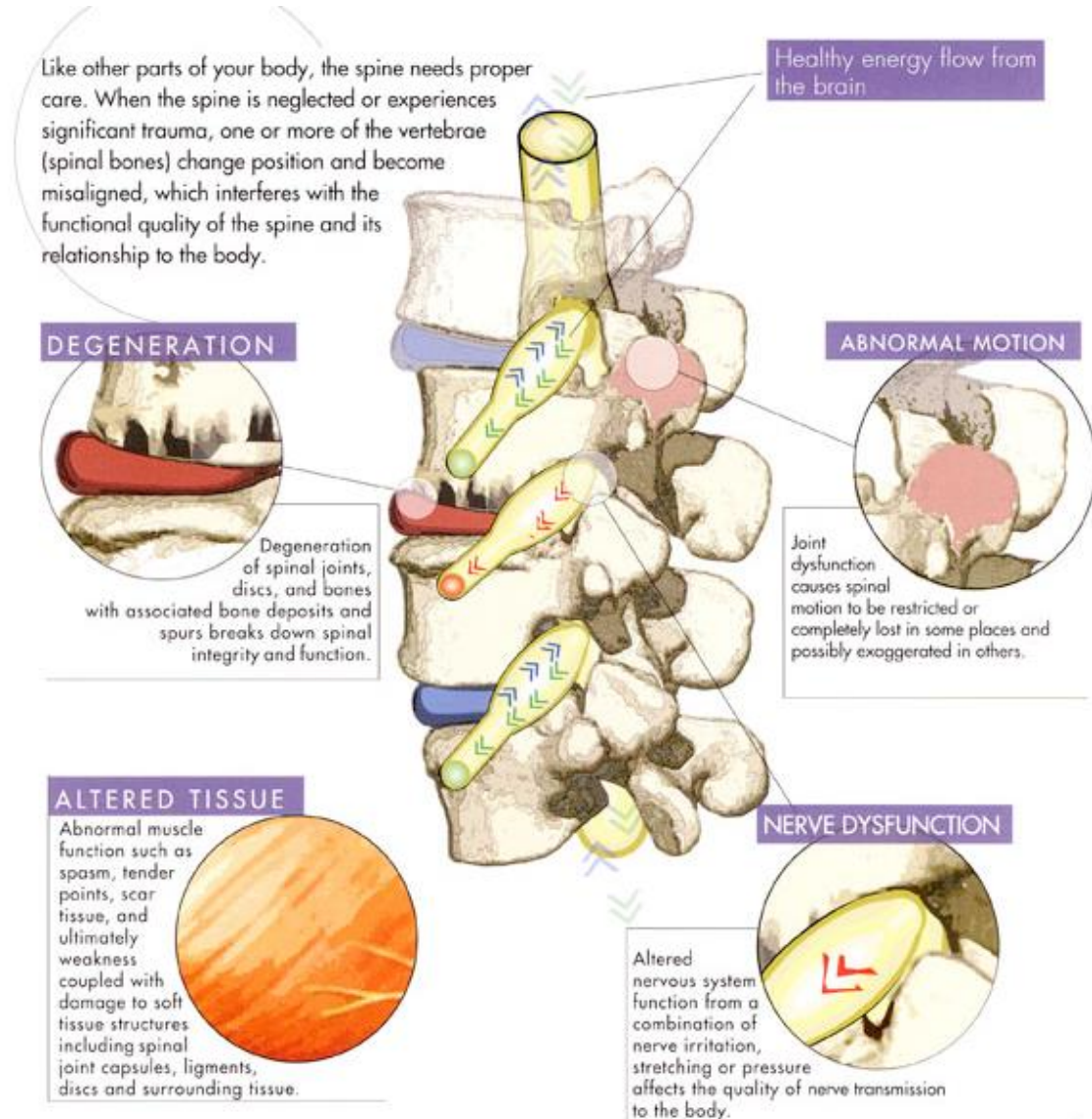
**Clinical
benefits**

Traditional Paradigms

Chiropractic

Subluxation:

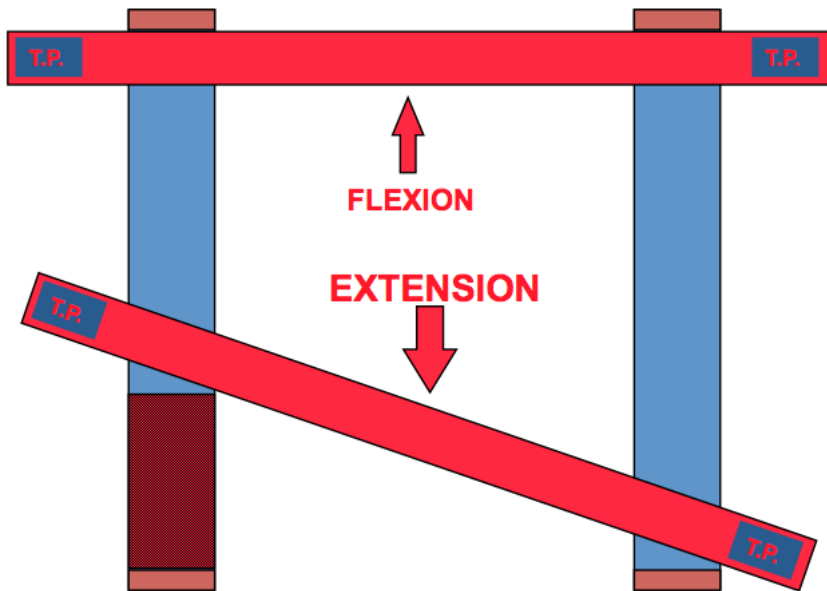
A complex of functional, structural, &/ or pathological articular changes that compromise neural integrity and may influence organ system and general health (Association of Chiropractic Colleges, 1996)



Traditional Paradigms

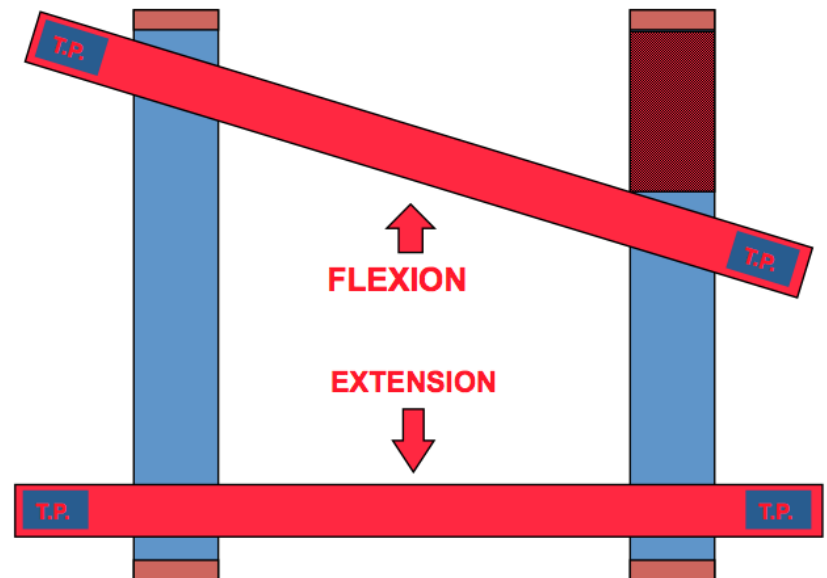
Osteopathic

Extension Restriction (FRS_{right})



* The Left Facet will not close *

Flexion Restriction (ERS_{right})



* The Right Facet will not open *



How complicated can we make things?





Contents lists available at ScienceDirect

Manual Therapy

journal homepage: www.elsevier.com/math



Original Article

The mechanisms of manual therapy in the treatment of musculoskeletal pain: A comprehensive model

Joel E. Bialosky^{a,*}, Mark D. Bishop^a, Don D. Price^b, Michael E. Robinson^c, Steven Z. George^a



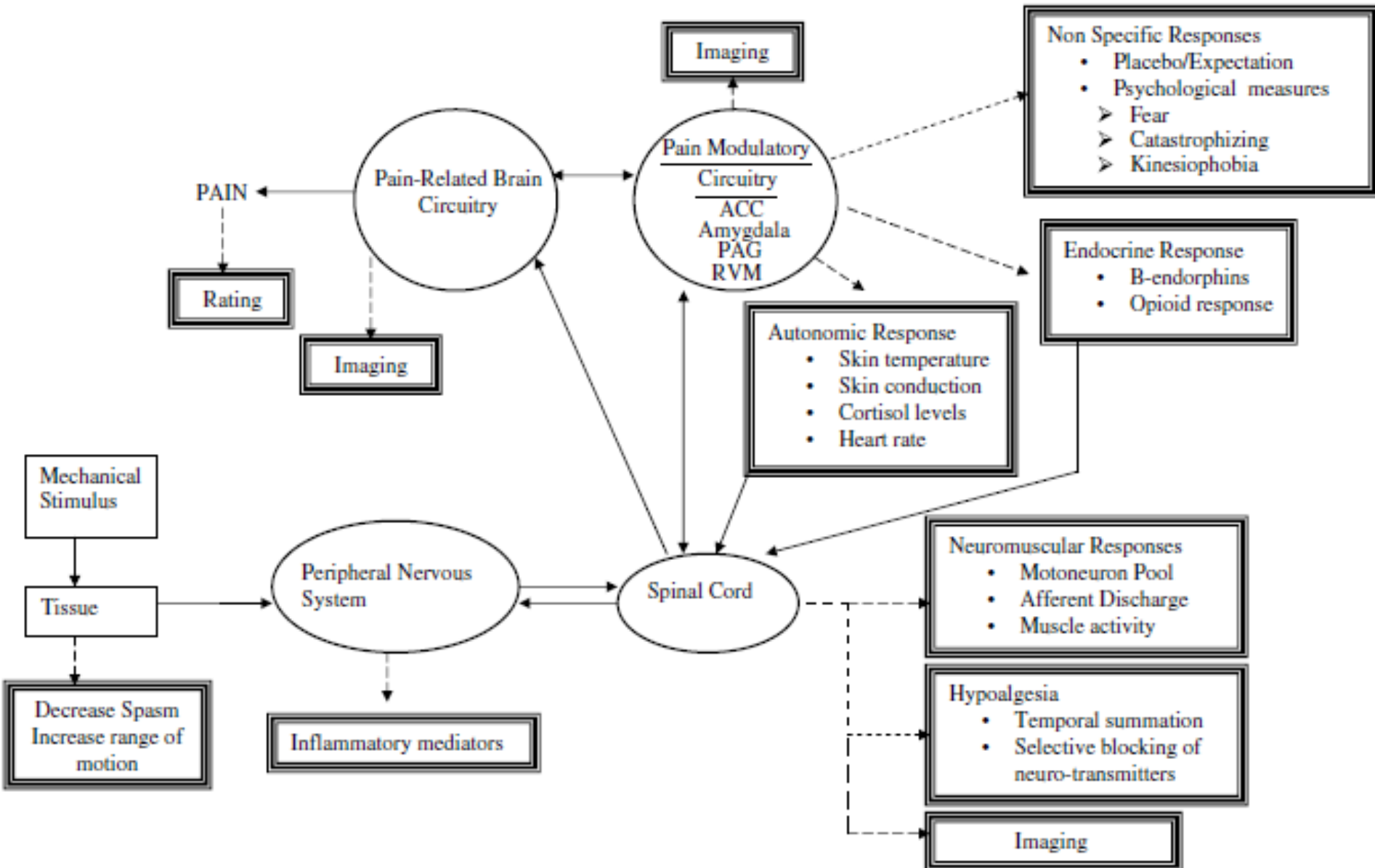
Biomechanical

Neurophysiological

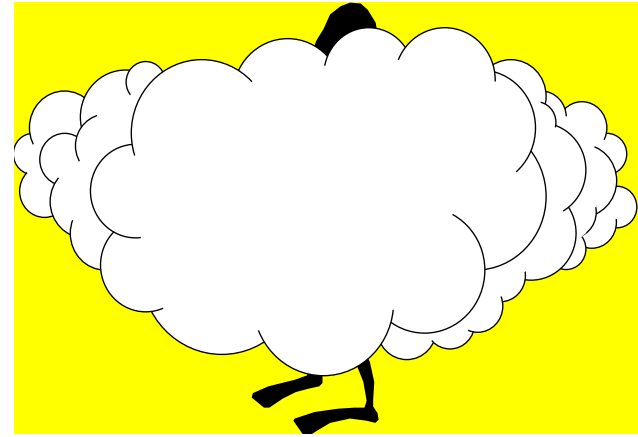
Model of Mechanisms for MT



(Bialosky J, et al, Manual Therapy, 2008)



Biomechanical rationale has little support!



- Most use the biomechanical rationale for:
 - Determining who needs manipulation
 - Success with manipulation

However, limited support for biomechanical rationale

How does manip & mob work?



(Bialosky J et al, Man Ther, 2008)

- Biomechanical

- ~~Moves mechanical impediment (loose body, disc, etc.)~~
- ~~Stretch periarticular tissue, to increase ROM~~

VERY LIMITED evidence:

- Moves vertebrae / corrects v. displacement
- Synovial fluid motion, aids in nutrient
- Compression / compression relief to articular cartilage
- Relationship between change in vertebral position or in motion & change in outcome

Mechanisms – Thoracic Spine



Manipulation – thoracic spine

- Biomechanical
 - Thoracic - No change in jt stiffness (Campbell BD, JOSPT, 2010)
 - Other spine regions – limited evidence
- Neurophysiological
 - Thoracic- Decrease sensitivity to pain (Bishop M, Spine, 2011)
 - Other spinal regions – evidence indicates:
 - Altered reflex or resting muscle activity, increased afferent discharge, hypoalgesia, and changes in dorsal horn excitability

How does manipulation work?



(Bialosky J et al, Man Ther, 2008)

- Psychological / Psychosocial
 - Placebo effect
 - Patient expectations of treatment effect
 - Patient preferences for treatment intervention



Treatment Expectations & Preferences

- **Treatment expectations**
 - Does the patient expect benefit from the treatment?
 - “Do you expect ____ to be helpful?”
- **Treatment preferences**
 - Does the patient have a preference for a treatment?
 - “Is there a treatment you believe will be helpful?”
- Ask your patient these questions!
 - Dialogue to reframe patient expectations/ preferences
- Evidence is mixed: May or may not have an effect on outcomes

OUTCOMES of Manipulation for Shoulder Pain



Manipulation *ONLY* – Cervical & thoracic, ribs

- Most studies were 1-2 treatments of manipulation:
↓ pain & ↑ patient-rated function
- Short term (1-2 weeks) and long-term effects when compared to other treatment or sham SMT indicate no superior benefit of manipulation

Mintken PE, et al, JOSPT, 2016

Mintken PE, et al, PTJ, 2010

Haik M, et al, APMR, 2017

Strunce JB, J Man Manip Ther, 2009

Boyles RE, et al, Man Ther, 2009

Bergman GJD, Ann Internal Med, 2004

Thoracic Manipulation and Shoulder Pain



- So, is there a subgroup of patients with shoulder pain who may likely respond to thoracic manipulation?

Some Factors Predict Successful Short-Term Outcomes in Individuals With Shoulder Pain Receiving Cervicothoracic Manipulation: A Single-Arm Trial

Paul E. Mintken, Joshua A. Cleland, Kristin J. Carpenter, Melanie L. Bieniek, Mike Keirns, Julie M. Whitman

January 2010

- N=80
- Patients with shoulder pain
- Multi-center study
- Single group

Predictors of Responders to Thoracic Manipulation



- 2 Treatments:
 - Manipulation
- HEP:
 - Cervical Mobility Exercise
 - Thoracic Mobility Exercise

Mintken et al upper and mid





Mobility Exercises



Some Factors Predict Successful Short-Term Outcomes in Individuals With Shoulder Pain Receiving Cervicothoracic Manipulation: A Single-Arm Trial

Paul E. Mintken, Joshua A. Cleland, Kristin J. Carpenter, Melanie L. Bieniek, Mike Keirns, Julie M. Whitman

January 2010

- Assessed next visit for 'success' of treatment
- Success:
GROC: "moderately better" or higher (4+ /7)
- N=49 'success'

Predictors of Responders to Thoracic Manipulation



5 predictors of 'success':

Pain-free shoulder flexion <127°

Shoulder internal rotation <53° at 90° of abduction

Negative Neer test

Not taking medications for their shoulder pain

Symptoms less than 90 d

- 89% success if 3/ 5+
- No control group
- No validation

Examination of the Validity of a Clinical Prediction Rule to Identify Patients With Shoulder Pain Likely to Benefit From Cervicothoracic Manipulation

PAUL E. MINTKEN, DPT, OCS, FAAOMPT^{1,2} • AMY W. MCDEVITT, DPT, OCS, FAAOMPT^{1,3} • LORI A. MICHENER, PT, ATC, PhD, SCS, FAPTA⁴
ROBERT E. BOYLES, PT, DSc, OCS, FAAOMPT⁵ • AMBER R. BEARDSLEE, DPT⁶ • SCOTT A. BURNS, DPT, OCS, FAAOMPT^{7,8}
MATTHEW D. HABERL, ATC, DPT, OCS, FAAOMPT⁹ • LAUREN A. HINRICHS, DPT, OCS¹⁰ • JOSHUA A. CLELAND, PT, PhD¹¹

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It takes a village to perform this study!



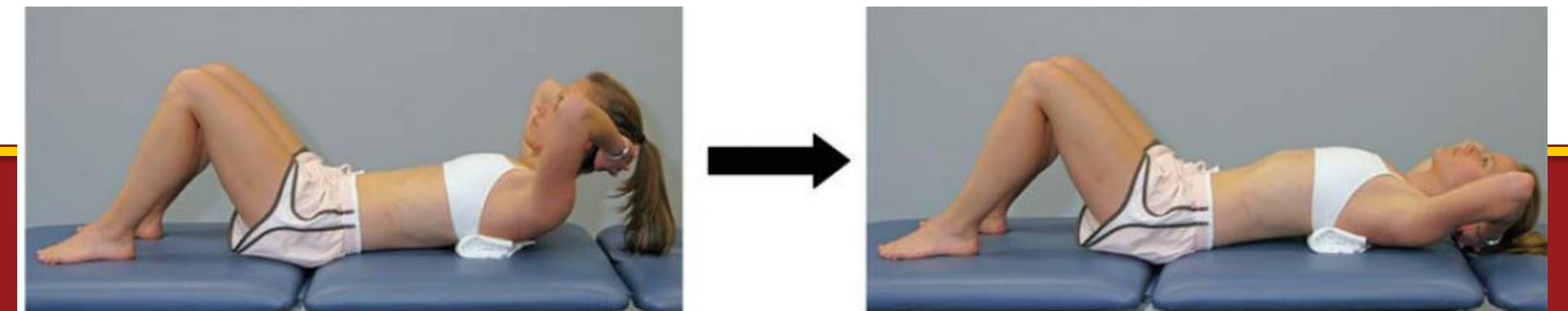
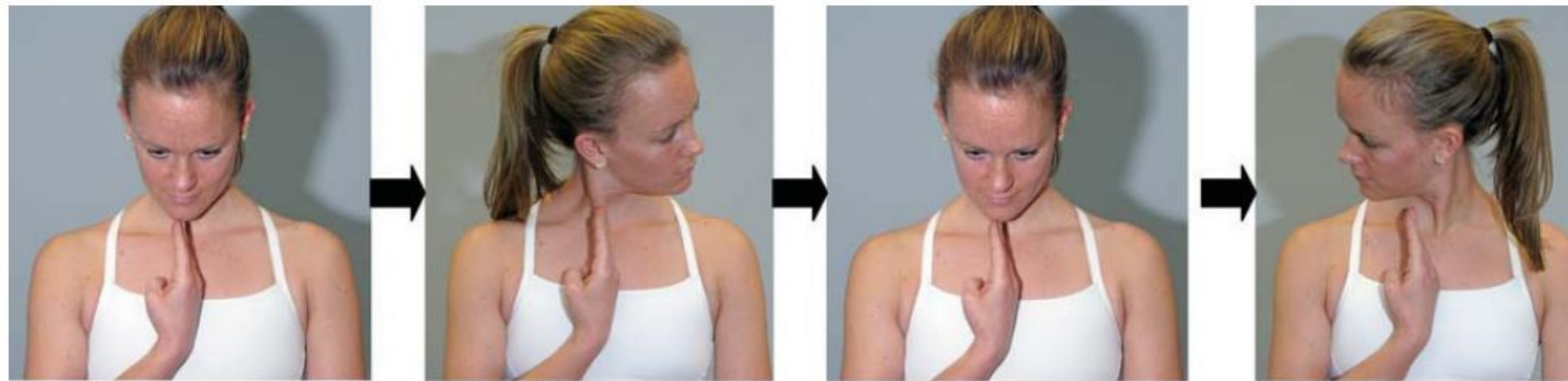
Validation study – Mintken et al, 2017

- N= 140
- Multi-center study
- RCT:
 - 2 treatments of Mobility only, then 6 exercise sessions
 - 2 treatments of manipulation only, then 6 exercise sessions

Manipulation techniques



Mobility Exercises



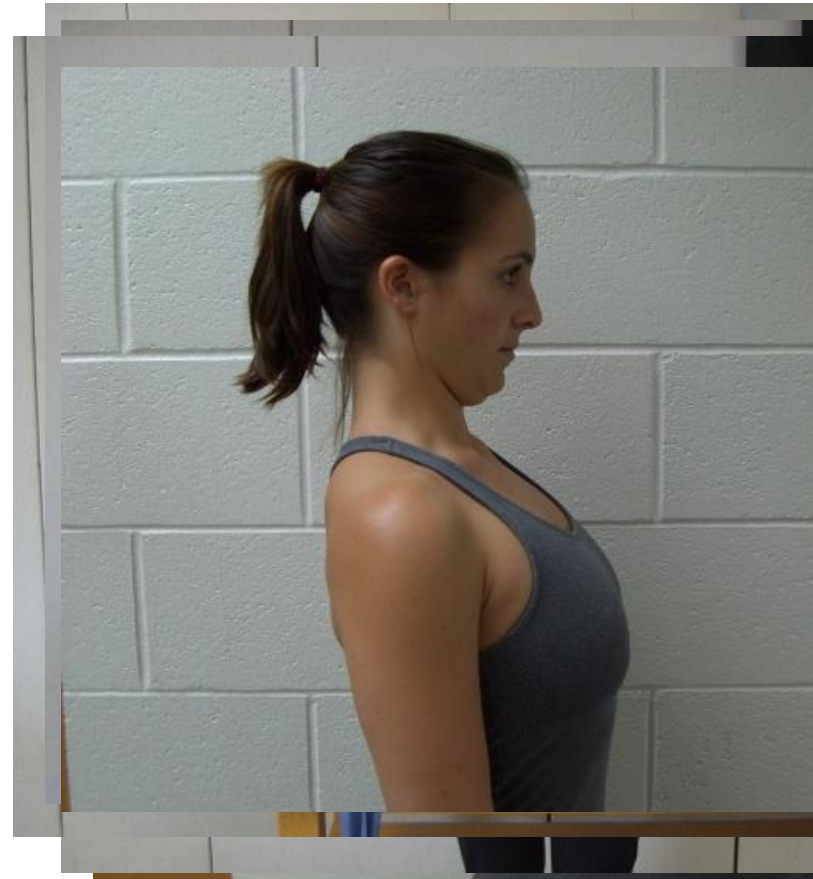
Exercises: Phase 1

Stretching:

- Cross body, Doorway Pec, supine over towel, shoulder IR & ER

Strengthen / Motor Control:

- Shoulder ER: arm at side
- Shoulder IR: arm at side
- Shoulder extension
- Scapular retraction
- Scap protract punch: supine
- UT relaxation with GH elev
- Posture training: with exercises & chin tuck



Criteria for progression to Phase 2

- Able to perform 3 sets of 10 reps with **Green** (latex) band without substantial pain or fatigue
- T-band Progression
 - **Yellow** => **Red** => **Green** => **Blue**

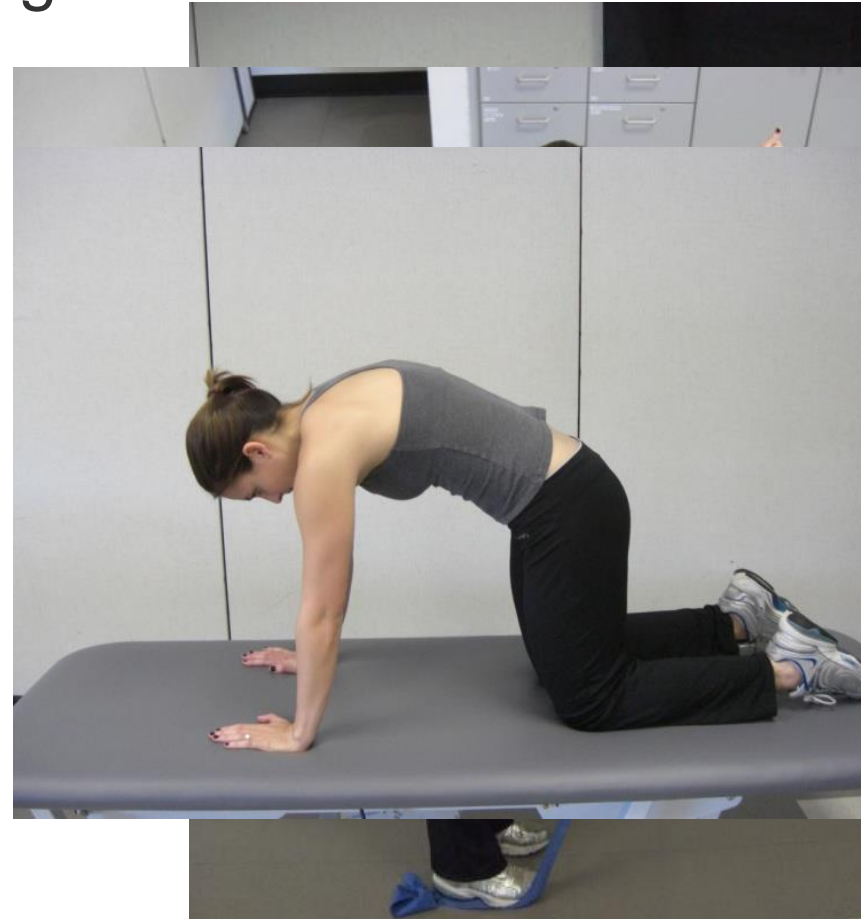
Exercises: Phase 2

Stretching: Same

Strengthening / Motor control

- Shoulder ER / IR resisted: progress from arm at the side to $45^\circ \rightarrow 90^\circ$
- Sh scaption: thumb up
- Sh flexion: thumb up
- Scap: “T” & “Y”: MT & LT
- Quadraped plus
- Posture training: with ex

Manual therapy:
Same



Exercises: Phase 3

Stretching: Same

Strengthening / Motor control

Phase 2 plus:

- Body blade below 60 degrees
- Body blade above 60
- Lawnmower pull
- Protraction plank
- Quadraped plus

Manual therapy:

Same



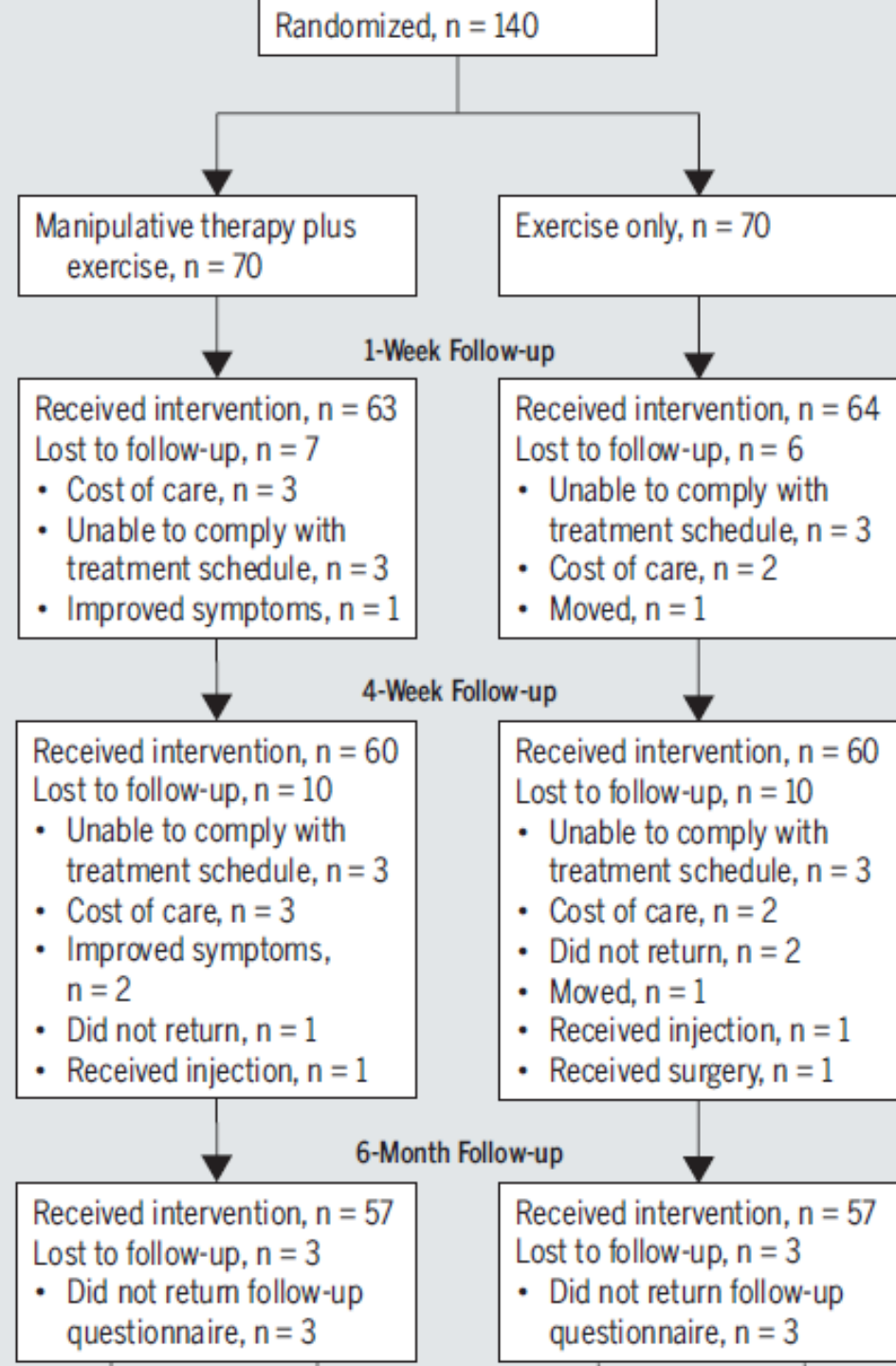
Validation study – Mintken et al, 2017

Baseline

1-week

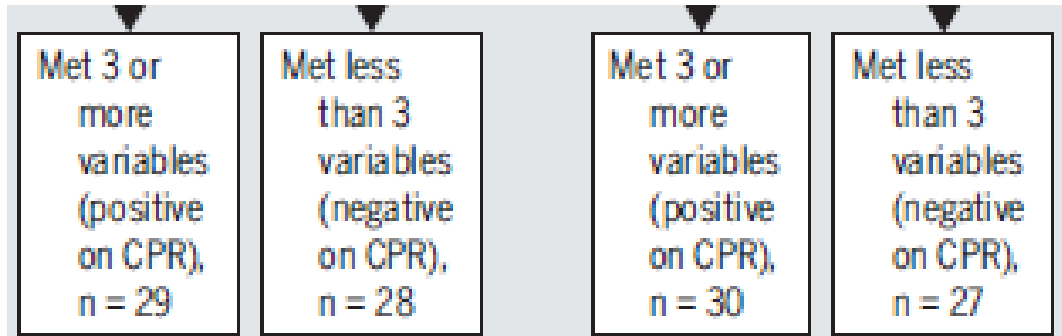
4-week

6-months





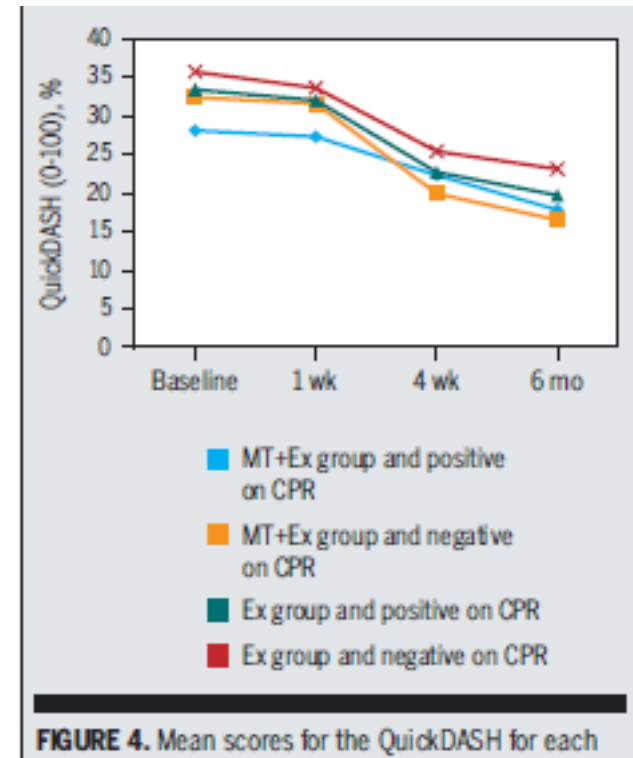
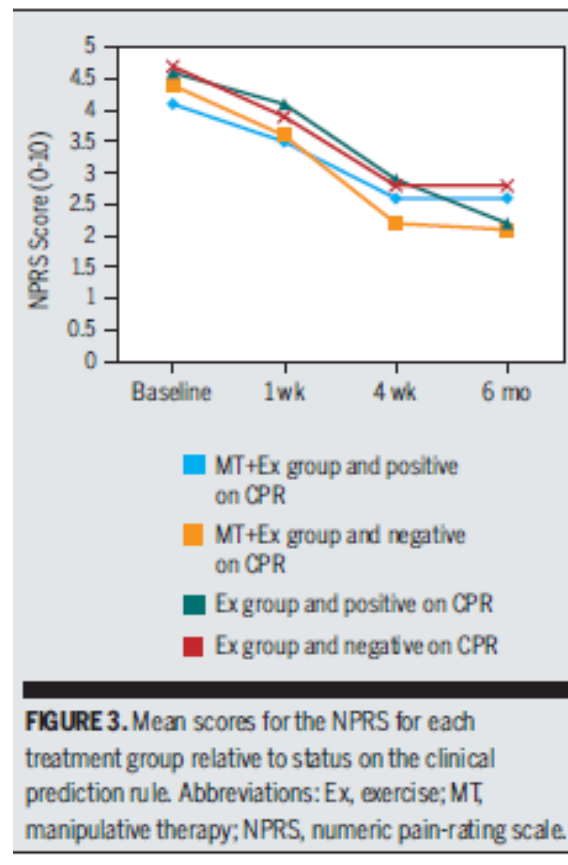
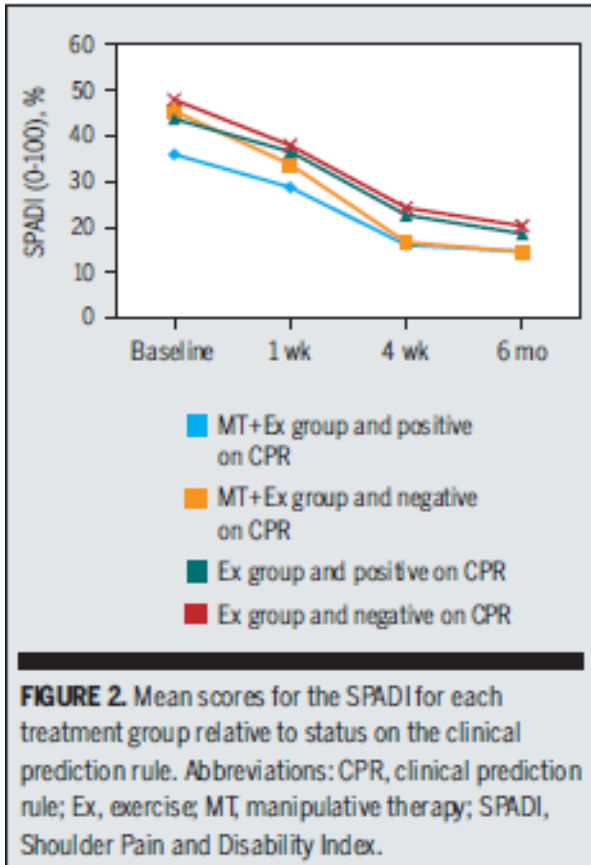
Validation study – Mintken et al, 2017



- + Predictors for manipulation (+3 /5):
 - Did they do better if assigned to manipulation?
 - **NO** – those +3/5 variable had no better Q-DASH, SPADI, or pain scores



Validation study – Mintken et al, 2017





Validation study – Mintken et al, 2017

- No support for use the 5 predictors

Pain-free shoulder flexion $<127^\circ$

Shoulder internal rotation $<53^\circ$ at 90° of abduction

Negative Neer test

Not taking medications for their shoulder pain

Symptoms less than 90 d

- Variables

- 3 were ‘mechanical’
- None targeted neurophysiological or psychosocial
- Consider for future studies

Cervicothoracic Manual Therapy Plus Exercise Therapy Versus Exercise Therapy Alone in the Management of Individuals With Shoulder Pain: A Multicenter Randomized Controlled Trial

PAUL E. MINTKEN, DPT^{1,2} • AMY W. MCDEVITT, DPT^{1,3} • JOSHUA A. CLELAND, PT, PhD⁴
ROBERT E. BOYLES, PT, DSc⁵ • AMBER R. BEARDSLEE, DPT⁶ • SCOTT A. BURNS, DPT^{7,8}
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Same village to perform this study!

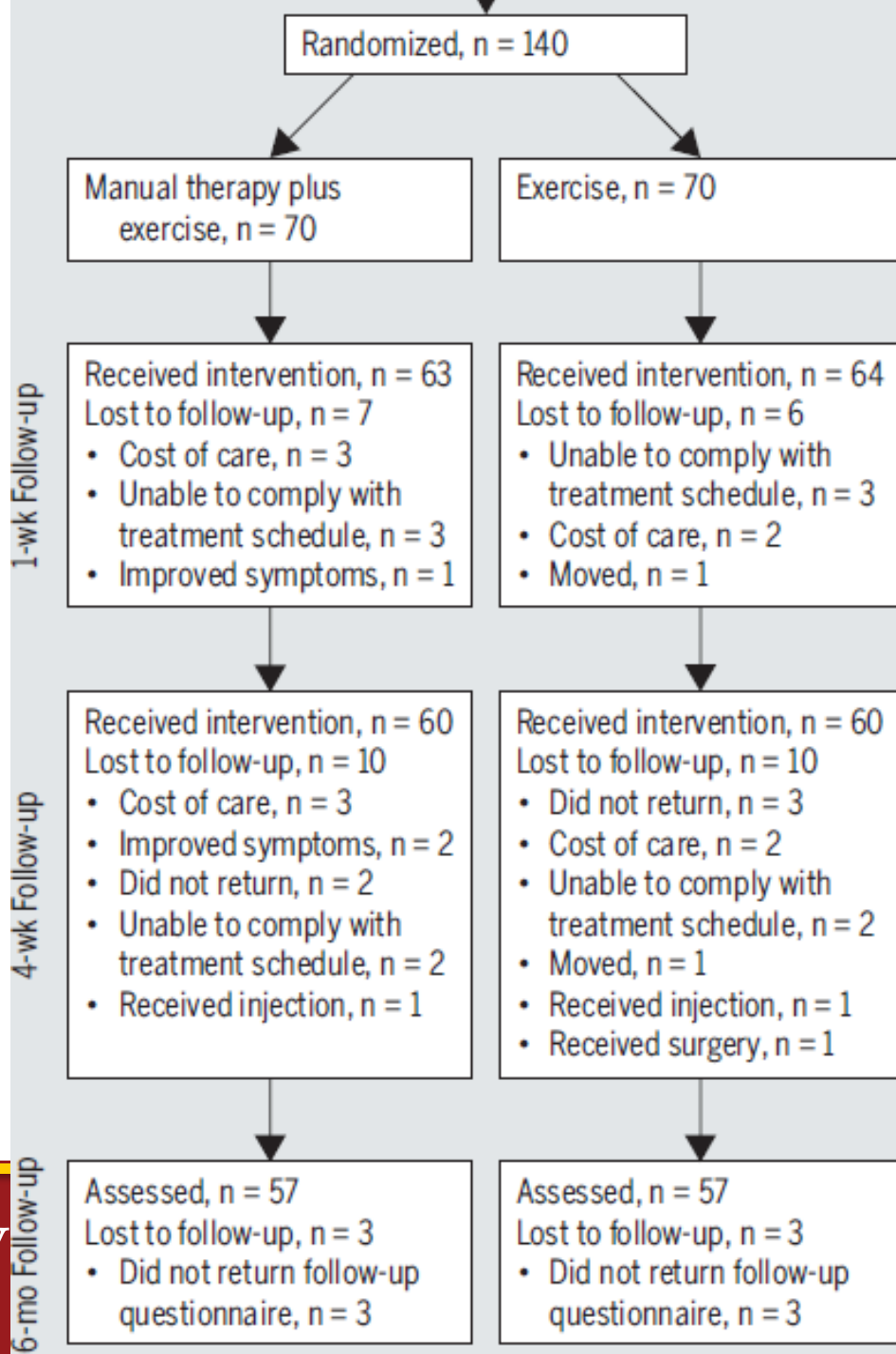


RCT – Mintken et al, JOSPT, 2016

- Same patients for the Validation study
- Analyzed data to determine:
 - Manipulation + Exercise vs. Exercise alone
- N= 140
- Multi-center study
- RCT:
 - 2 treatments mobility only, then 6 exercise sessions
 - 2 treatments of manipulation only, then 6 exercise sessions

RCT – Mintken et al, JOSPT, 2016

- Baseline
- 1-week
- 4-weeks
- 6 months





RCT – Mintken et al, JOSPT, 2016

- Manipulation + Exercise vs. Exercise alone
 - QDASH, SPADI, Pain :No additional benefit of manipulation

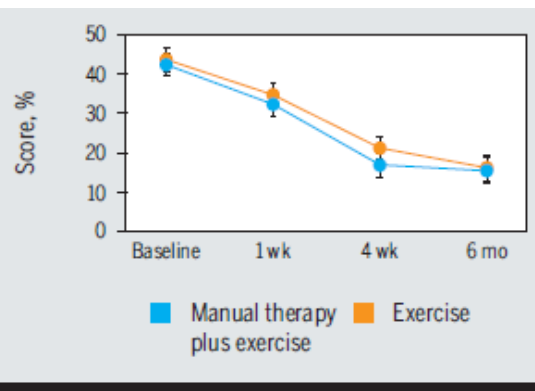


FIGURE 4. Shoulder Pain and Disability Index scores for both groups across time.

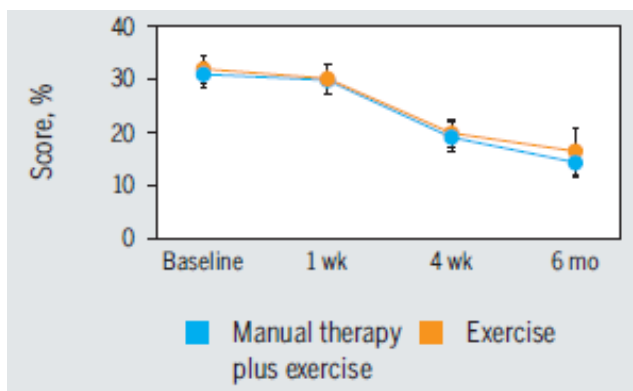


FIGURE 6. QuickDASH scores for both groups across

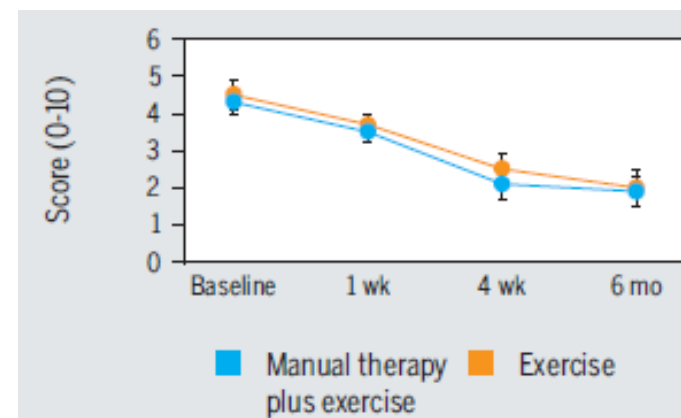


FIGURE 5. Numeric pain-rating scale scores for both

RCT – Mintken et al, JOSPT, 2016



- Patient perceived overall success for manipulation group:
 - GRoC @ 4 wks and 6 months
 - PASS (patient acceptable symptom state) @ 4wks

PASS: “in 6 months, if left the way you are today, would you be satisfied”

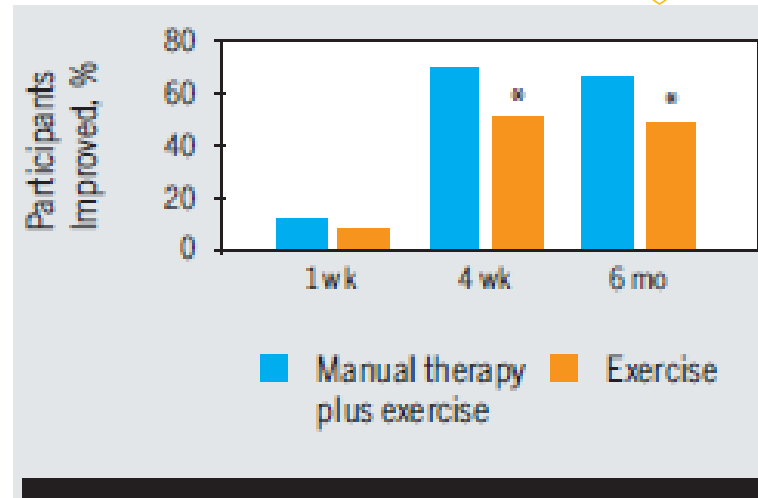


FIGURE 2. Global rating of change success (+5 or greater) by group and time. *Statistically significant

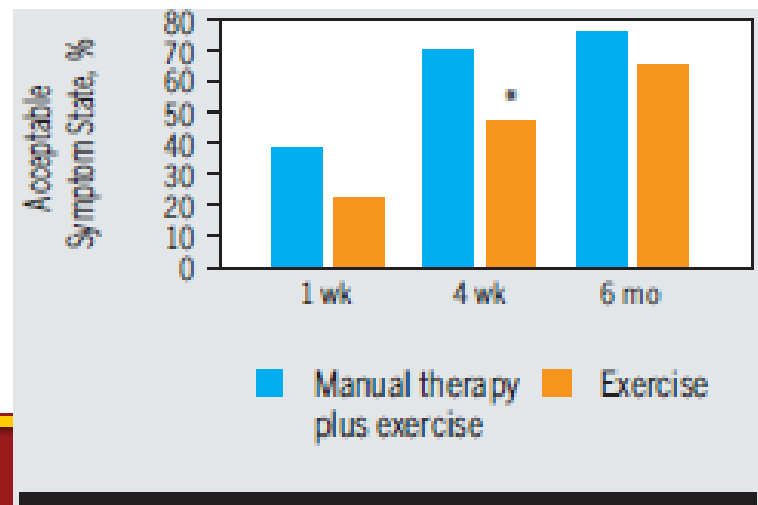


FIGURE 3. Patient Acceptable Symptom State success (response of “yes”) by group and time.

Why did patients who had manipulation have higher % report GRoC and PASS?



- Not treatment preference for manipulation
- Hands-on technique?
 - May help to reassure the patient
 - May help to facilitate relaxation
- Overall feel better – brain/ CNS?

RCT – Mintken et al, JOSPT, 2017



- Conclusion:
 - Adding manipulation to an exercise program did not improve pain or disability at 1w, 4w, 6m
 - However, patients did report greater perceived success and acceptability of symptoms

RCT – Mintken et al, JOSPT, 2017



- Other variables?
 - Neurophysiological
 - Central sensitization measures
 - Measures of altered CNS activity in motor or sensory cortex
 - Measures of altered functional connectivity in the brain
 - Psychological
 - Depression, anxiety, fearful, others?



Overall Conclusions

- Manipulation may be helpful for some, but we are unsure of which patients
- Predictors of success/ responders were not validated
- Consider factors other than biomechanics
- Those who received manipulation reported higher rates of self-perceived success.



Thank you!

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and Physical Therapy

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