Duke University School of Medicine

Doctor of Physical Therapy

Effectiveness of Physical Therapy Administered Spinal Manipulation for the Treatment of Low Back Pain: An Updated Systematic Review of the Literature

Nermin Gradascevic SPT, Meaghan Reardon SPT, Travis Rhea SPT,
Hannah Colopy SPT, Chad Cook, PT, PhD, MBA, FAAOMPT
Duke University School of Medicine

Background

- **Low back pain (LBP)** is the most common disability among adults
- 80 – 90% lifetime prevalence
- Leading causes: loss of work productivity and medical care dollars spent
- Traditional treatments: pharmaceuticals, exercises and/or spinal manipulation

Purpose

- Update on **effectiveness of Spine Thrust Manipulation (STM) for LBP treatment** as a follow-up study to the systematic review authored by Kuczynski et al. (2012)

Methods

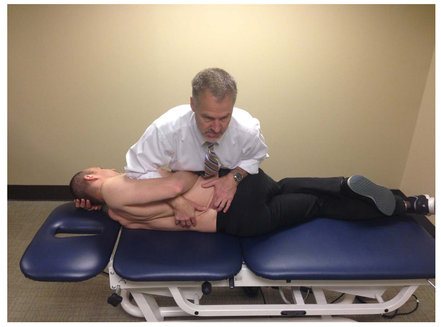
- Systematic Review of 11 Randomized Control Trial (RCT) articles compared STM to any other treatment methods
- PRISMA guidelines used to report items
- Data pulled on July 11, 2016 from PubMed, CINAHL, and Embase following Cochrane Collaboration guidelines
- All of the studies published in English
- Articles randomly assigned to two independent authors for review
- Interrater reliability measured using Cohen's Kappa coefficient
- Risk of bias assessed using the Cochrane Risk of Bias tool
- Eligibility criteria:
  - patients with LBP
  - STM performed by a physical therapist
  - control groups not receiving STM
  - standardized outcome measures
- Outcome measures and comparator interventions reported across the entire dataset were gathered in a PICOS table

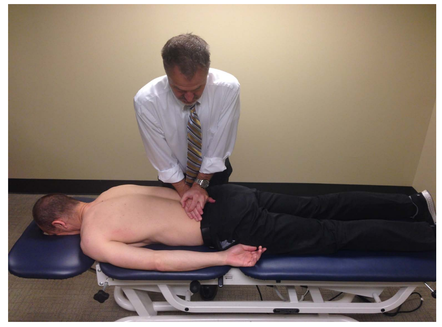
Analysis

- Most frequently reported outcome measure(s) identified and **Cohen's d effect size** calculated [Effect d <0 adverse ; 0.0-0.2 no effect; 0.2-0.5 small; 0.5-0.8 intermediate; ≥0.8 large]
- Meta-analysis: not conducted due to the lack of standardized timeframe in pre- and post-treatment outcome measurements.

Results

- Total of 1,120 subjects participated in the aforementioned RCTs





Pain (NPRS)	STM n=	Mean STM (SD)	Comparator n=	Mean Comparator (SD)	P value	Effect Size (Cohen's d)	Risk of Bias Total
Bialosky et al (2009) [0-100]	12	NR	12	NR	NR	#	LOW
Bialosky et al (2014) [0-10]	28	NR	82	NR	NR	#	LOW
Castro-Sánchez et al (2016) [0-10]	31	4.9 (1.6)	31	4.6 (1.7)	0.925	-0.18	LOW
Cleland et al (2009) [0-10]	37	NR	37	NR	NR	#	LOW
Cook et al (2013) [0-10]	76	1.8 (1.8)	73	1.9 (1.5)	0.66	0.06	LOW
Fritz JM et al (2015) [0-10]	108	1.3 (1.7)	112	1.4 (1.9)	0.44	0.05	UNCLEAR
Hallegraeff et al (2009) [0-100]	31	19.0 (16.9)	33	24.8 (20.1)	0.26	0.31	LOW
Mosheni-Bandpei et al (2006) [0-100]	56	23.4 (29.4)	56	37.9 (28.3)	0.001	0.50	LOW
Perry J, et al (2015) [0-10]	25	NR	25	NR	NR	#	LOW
Venegas-Rios et al (2009) [0-100]	33	41.12 (27.25)	33	46.45 (27.64)	0.433	0.19	UNCLEAR

Disability (ODI)	STM n=	Mean STM (SD)	Comparator n=	Mean Comparator (SD)	P value	Effect Size (Cohen's d)	Risk of Bias Total
Bialosky et al (2014) [%]	28	NR	82	NR	NR	#	LOW
Castro-Sánchez et al (2016) [0-50]	31	24.8 (13)	31	28.1 (13.6)	0.015	0.25	LOW
Childs et al (2004) [%]	70	NR	61	NR	NR	#	HIGH
Cleland et al (2009) [%]	37	NR	37	NR	NR	#	LOW
Cook et al (2013) [%]	76	14.9 (13.9)	73	17.2 (13.1)	0.31	0.17	LOW
Fritz JM et al (2015) [%]	108	7.0 (11.4)	112	9.0 (11.6)	0.19	0.17	UNCLEAR
Hallegraeff et al (2009) [0-50]	31	14 (17)	33	14(12)	0.38	0.00	LOW
Mosheni-Bandpei et al (2006) [%]	56	12.9 (14.9)	56	22.1 (14.7)	0.001	0.62	LOW
Perry J, et al (2015) [%]	25	NR	25	NR	NR	#	LOW
Venegas-Rios et al (2009) [0-50]	33	12.97 (8.27)	33	17.12 (9.66)	0.066	0.46	UNCLEAR

Means and Standard Deviations for Pain recorded at patient discharge; NR=not reported; STM=spine thrust manipulation; #=not calculated

Results

- Cochrane Risk of Bias: 7 Low risk, 3 Unclear risk, & 1 High risk
- Comparator interventions identified in PICOS: bicycle cardiovascular exercise, low back extension, AROM, ultrasound, and non-thrust manipulation
- **Oswestry Disability Index** (ODI) and **Numeric Pain Rating Scale** (NPRS) were the most commonly used outcome measures within studies identified (90.9%)
- Resulting means and standard deviations used for Cohen's d effect size to measure the effect between intervention and control group
- The majority of the studies reported no to small effect sizes in favor of STM over the comparator

Conclusions

- Overall findings: "**no" to "small" effect size** in contrast to Kuczynski et al. findings
- No consistent conclusion on any meaningful differences between STM and the comparators in terms of efficiency in LBP patients
- Aside from one study (Bialosky et al 2014), no true control groups were used which limits the definitive nature of their papers
- No clear evidence in clinical practice for using STM over comparator interventions

Clinical Relevance

- STM vs comparator interventions: both are safe and equally effective to use for LBP treatment
- Overall, patient preference should be highly considered when selecting an intervention for the treatment of patients with LBP.

Acknowledgements / References

Acknowledge Leila Ledbetter, MLIS for her assistance in conducting the database search

*References are available upon request