



Critical Appraisal of a Systematic Review

Goal:

Participants will be able to critically appraise a systematic review.

Objectives:

1. Assess the validity of a systematic review
2. Understand the concept of heterogeneity and how this is measured
3. Interpret a meta-analysis plot
4. Appreciate the role of a sensitivity analysis
5. Gain awareness of the issues with subgroup analyses

Reference (Further Reading):

Guyatt GH, Rennie D, Meade M, Cook DJ. Editors. Users' Guides to the Medical Literature: A Manual for Evidence Based Clinical Practice, 3rd Edition, New York, NY: The McGraw-Hill Companies, Inc.

Available here:

<http://jamaevidence.mhmedical.com/book.aspx?bookID=847>

- Chapter 22: The Process of a Systematic Review and Meta-analysis
- Chapter 23: Understanding and Applying the Results of a Systematic Review
- Chapter 24: Network Meta-analysis
- Chapter 25.1: Fixed-Effects and Random-Effects Models
- Chapter 25.2: How to Use a Subgroup Analysis

Educational Exercise:

1. Read the Users' Guides to the Medical Literature reference chapters (listed above)
2. Advanced learners could review chapters 24 & 25
3. Read the Clinical Scenario (below)
4. Read the article "The effectiveness of thoracic spine manipulation for the management of musculoskeletal conditions: a systematic review and meta-analysis of randomized clinical trials"
5. Complete the critical appraisal form
6. Return to the scenario and formulate a recommendation
7. Advanced learners could use this module in tandem with the practice guideline module and grade the evidence, discuss whether they would recommend the intervention or not, and decide with what strength they would make such a recommendation

Clinical Scenario:

A 39-year-old male presents with a primary complaint of neck pain of 1 months' duration. The pain is described as a dull ache that involves the back of the neck. Onset was insidious; there is

no radiation of pain nor other neurological findings. Screening for ‘red flags’ is unremarkable (e.g. no fever, night pain, unexplained weight loss, etc.). Aggravating factors are sustained desk work, and pain is temporarily relieved by rest, massage, or use of a hot pack.

The patient has been active on the Internet in a search for treatment options and this exercise has left him more confused than informed. He comes to you seeking some clarification on what treatment options may be worth pursuing; specifically, a colleague of his has suggested that spinal manipulation may be helpful (but also advised him to avoid manipulation of his neck due to safety concerns).

Using PubMed ‘clinical queries,’ you identify the following systematic review which you decide to explore further:

Walser et al. The effectiveness of thoracic spine manipulation for the management of musculoskeletal conditions: a systematic review and meta-analysis of randomized clinical trials. J Man Manip Ther. 2009; 17(4): 237-46.

The abstract indicates it is relevant to your patient and you decide to critically appraise this paper using the “Users’ Guides” for a systematic review.

After critically appraising this paper, will you recommend thoracic spine manipulation?



CRITICAL REVIEW FORM: SYSTEMATIC REVIEW

Identify and outline your clinical question in plain language:

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Build a PICO:

P	
I	
C	
O	

Databases Searched:

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Resource Acquired:

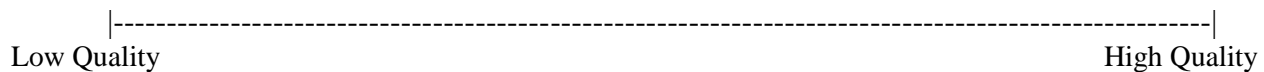
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Are the results of the study valid?

Did the review explicitly address a sensible question?	
Was the search for relevant studies detailed and exhaustive?	
Were the primary studies of high methodologic quality?	

Were the assessments of the included studies reproducible?	
What are the results?	
What are the overall results of the study?	
How precise are the results?	
Were the results similar from study to study?	

Strength of Evidence:



How does this apply to your patient?

CRITICAL REVIEW FORM: SYSTEMATIC REVIEW

Identify and outline your clinical question in plain language:

What is the effectiveness of thoracic spinal manipulation for neck pain?

Build a PICO:

P	Neck pain
I	Thoracic spine manipulation
C	N/A
O	Decreased pain

Databases Searched:

PubMed

Resource Acquired:

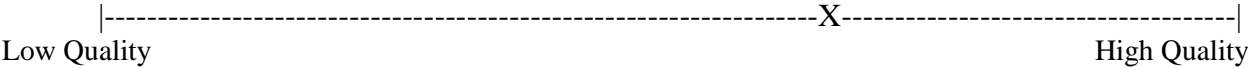
The effectiveness of thoracic spine manipulation for the management of musculoskeletal conditions: a systematic review and meta-analysis of randomized clinical trials

Are the results of the study valid?

Did the review explicitly address a sensible question?	Yes, though a well formulated review question in terms of population, intervention, comparison and outcome is not stated anywhere. The last paragraph of the introduction covers some elements of the question.
Was the search for relevant studies detailed and exhaustive?	Probably yes. Five electronic databases, reference lists of articles found were searched. Authors also sent emails to the contact authors of all articles to enquire if any article has been missed. But there is language bias. Only English language articles are included.
Were the primary studies of high methodologic quality?	Authors assessed methodological quality of the papers using a validated scale, Pedro. Seven of the studies were considered of high quality, four of fair quality, and two of poor quality.

Were the assessments of the included studies reproducible?	Not tested. Only one author conducted the assessment, and therefore, reproducibility could not be determined.
What are the results?	
What are the overall results of the study?	The value of the pooled estimator (1.33) was statistically significant for the treatment effect of TSM in the studies with “researcher effect” removed. The “researcher effect” is, however, an unconventional adjustment for which no compelling rationale is provided. Also problematic is the pooling of all reported outcomes both within and across trials (e.g. pain, range of motion, disability). Note: a standard rule of thumb for interpreting effect sizes is that 0.2 represents a small effect, 0.5 a moderate effect, and 0.8 a large effect.
How precise are the results?	95 % CI: 1.14,1.52
Were the results similar from study to study?	No.

Strength of Evidence:



How does this apply to your patient?

-There is limited evidence from 9 small trials, once the “researcher effect” is removed, that TSM can produce significant short-term improvement in pain, disability, and range of motion for uncomplicated musculoskeletal neck pain. However, the analysis used by the authors seems problematic and as such the strength of inferences is very low. Furthermore, the review authors did not provide details on the frequency and duration of TSM used in the trails they reviewed which complicates recommendations. A trial of TSM may be reasonable to discuss, but the heterogeneity of trial results precludes any strong recommendations.

Adapted by John Stites DC and Amy Minkalis DC from: Walsh M, Perkovic V, Manns B, Srinathan S, Meade MO, Devereaux P, Guyatt G. Summarizing the Evidence. In: Guyatt G, Rennie D, Meade MO, Cook DJ. eds. *Users' Guides to the Medical Literature*. New York, NY: McGraw-Hill; 2014.