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The anatomy of a systematic review CCC-OCA & CCRF webinar series Module 2 April 12, 2011

Eileen Vilis



Provision of Elluminate Live!

• We are grateful to PAHO / WHO Research

Promotion and Development for their partnership









- 1. Evidence quality
- 2. RCTs (Randomized Controlled Trials)
- 3. Reviews: General & systematic reviews
- 4. Reviews: Cochrane systematic reviews
- 5. Anatomy of a systematic review











Why are RCT Important?

- Building blocks of knowledge about the benefits and harms of healthcare treatments
- Assess safety/efficacy of a treatment or intervention
- Everyone has an equal chance of being part of the treatment or control
- Equally balances the known and unknown
 - (if the sample size is large enough)
 - So differences in outcome between groups are likely due to differences in treatment



Why do a literature review?

- Identify gaps, methodological problems, the current status of research
- Utilises basic researching, handsearching and sometimes critical appraisal skills
- Identifies good sources, experts, potential avenues to pursue





General review

- General overview
- No focused question
- Expert opinion
- Non-systematic selection of literature



Non-systematic synthesis



Systematic review defined...

Systematic reviews are an efficient scientific approach for identifying and summarising evidence ... that allow the generalisability and consistency of research findings to be assessed and data inconsistencies to be explored.

Mulrow CD (1994) British Medical Journal





Systematic Reviews are used...

- Diagnostic test performance
- Effectiveness of interventions
- Efficiency of interventions
- Qualitative research
- Research methods
- Theories or models





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Are Systematic Reviews Science?

- Systematic reviews use rigorous methods to collect and analyse observations from a clearly defined population (primary studies) around a clearly defined question
- Systematic reviews are not simple mechanistic applications of a method but require considerable judgment and skill throughout review process





Standard scientific approach

- Objectives
- · Selection criteria
- Search strategy
- · Data collection and analysis
- · Report main results
- Authors' conclusion





Systematic review framework

Framework

- Objectives
- Selection criteria a priori
- Search strategy defined a priori
- Data collection, appraisal and analysis
- Results
- Conclusion



Cochrane Handbook for Systematic Reviews of Interventions www.cochrane-handbook.org

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Cochrane reviews answer questions

- What is my risk of disease?
- How can I reduce my risk of disease?
- When should I access health care services?
- How is the disease diagnosed?
- What treatment options do I have?
- What are the benefits and harms of different treatment options?
- What is my prognosis?



Cochrane systematic reviews

- Effects of healthcare interventions, including diagnostics
- All have the same structure & format
- Start as a Protocol and become Review
- Summarize evidence
- Help people understand evidence
- Keep audience in mind while writing
- Careful not to impose own values,
 - preferences, local context



Cochrane Reviews

- STEP 1: Define the problem & formulate a question
- STEP 2: Write protocol with inclusion eligibility criteria
- STEP 3: Identify and select studies applying criteria
- **STEP 4**: Data collection: study characteristics, risk of bias, outcome data
- **STEP 5**: Analyze and present results
- **STEP 6**: Interpret results and write review
- **STEP 7**: Update review





Anatomy of a review

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[Intervention Review] Manipulation or Mobilisation for Neck Pain	[Intervention Review] Manipulation or Mobilisation for Neck Pain Anita Gross ¹ , Jordan Miller ² , Jonathan D'Sylva ³ , Stephen J Burnie ⁴ , Charles H Goldsmith ² , Nadin	e Graham ⁶ , Ted Haines ⁷ , Gert Bronfort ⁸ , Jan L Hoving ⁹
PDF • Summary (69 K) • Standard (991 K) • Full (1157 K)	¹ School of Rehabilitation Science & Dept Clinical Epidemiology and Biostatistics, McMaster U ⁴ Department of Clinical Education, Canadian Memorial Chiropractic College, Toronto, Canada. ⁴ Hamilton, Canada. ⁴ School of Rehabilitation Science, McMaster University, Ancaster, Canada. ² Canada. ⁴ Wolfe-Harris Center for Clinical Studies, Northwestern Health Sciences University, Bl Medical Centra University in Restration. Mexication Networkshold.	itversity, Hamilton, Canada. ³ Georgetown, Canada. ³ Markham, Canada. Department of Clinical Epidemiology & Biostatistics, McMaster University, 'linical Epidemiology & Biostatistics, McMaster University, Hamilton, oomington, MN, USA. ⁹ Coronel Institute of Occupational Health, Academic
Abstract Plain language summary	Contact address: Anita Gross, School of Rehabilitation Science & Dept Clinical Epidemiology a Ontario, L8S 1C7, Canada, grossa@mcmaster.ca. grossa@sympatico.ca.	d Biostatistics, McMaster University, 1400 Main Street West, Hamilton,
Quick links • What's new The review	Editorial group: Cochrane Back Group. Publication status and date: Edited (no change to conclusions), published in Issue 5, 2010. Review content assessed as up-to-date: 7 July 2009.	
Background Objectives	Citation: Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, Haines T, Bronfort Database of Systematic Reviews 2010, Issue 1. Art. No.: CD004249. DOI: 10.1002/14651858.	G, Hoving JL. Manipulation or Mobilisation for Neck Pain. <i>Cochrane</i> CD004249.pub3.
Methods	Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.	-
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Step 1: Formulate question

Does manipulation or mobilization improve function/disability , patient satisfaction , quality of life and global perceived effect in adults with acute/subacute /chronic neck pain with or without cervicogenetic headache or radicular findings?

Manipulation or Mobilisation for Neck Pain

• Abstract

Background

• Manipulation and mobilisation are often used, either alone or combined with other treatment approaches, to treat neck pain.

Objectives

• To assess if manipulation or mobilisation improves pain, function/disability, patient satisfaction, quality of life, and global perceived effect in adults with acute/subacute/chronic neck pain with or without cervicogenic headache or radicular findings.





Step 2: Cochrane protocol

- Standard format: systematic, easy to find information
- Anatomy:
 - 1. Title
 - 2. Review authors
 - 3. Contact person
 - 4. Background
 - 5. Objectives

- 6. Selection criteria
- 7. Search methods
- 8. Data collection and analysis
- 9. Declarations of interest





Step 3a. Identify studies: Search strategy

- 1. Define the question using keywords (PICO)
- 2. Check other well done studies or reviews
- 3. Subject headings and descriptors / free text and textwords
- 4. Use AND, OR, NOT (Boolean operators)
- 5. Study design filters
- 6. Manage your search results





Manipulation or Mobilisation for Neck Pain

Search strategy

CENTRAL (*The Cochrane Library 2009*, issue 3) and MEDLINE, EMBASE, Manual Alternative and Natural Therapy, CINAHL, and Index to Chiropractic Literature were updated to July 2009

Selection criteria

Randomised controlled trials on manipulation or mobilisation.





Step 3b. Study selection

- Want to make decisions about which studies to include based on design, not results
- Studies, and not reports, are the unit of interest
- Apply eligibility criteria to select studies
- Describe the trial quality
- Determine if the quality of the trial impacts results
- 2 reviewers examine each study





Step 3b. Study selection





Step 4: Data collection

- Studies examined, the data collected and reported
- Includes notes on study design, type of participants, intervention, outcomes, notes and assessment of risk of bias
- Try to determine what was done versus what was reported
 - List of excluded studies as citations also recorded.





Meta-analysis - pooling results

The use of statistical techniques in a systematic review to integrate the results of included studies.



Cochrane Collaboration (2005) Glossary of Terms



Meta-analysis – pooling results

Benefits:

- Increases statistical power
- To improve precision
- Answer questions not posed by individual studies
- Settle controversies or generate new hypotheses

Inappropriate when:

- Studies are clinically diverse
- A mix of comparisons \rightarrow assess separately
- Outcomes too diverse
- Studies at high risk of bias, may be misleading
- Presence of serious publication or reporting biases

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Example of Forest plot

Figure 7. Forest plot of comparison: Cervical manipulation: manipulation versus mobilisation (pooled) - pain for any figure f		🖕 - 🏟 🏟 18 / 110 1k 🕙 🤻 🖲 💿 141% - 🖌 Sign - 🔚 🔛 Find -
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and muscle energy performed to the thoracic spine and sacroiliac diate benefit for both neck pain and headache intensity was re-		 combined therapeutic approach including manipulation weeks, and 12 sessions over three weeks (Haas 2004). An imme-
	>	and muscle energy performed to the thoracic spine and sacroiliac diate benefit for both neck pain and headache intensity was re-
inter (Second 1000). norted by the author with 12 sessions when compared to three		(

Step 6: Discussion & Conclusion

- Help interpret findings; contextualization; complementary considerations
- Headings:
 - Summary of main findings (benefits and harms)
 - Overall completeness and applicability of the evidence
 - Quality of the evidence
 - Potential biases in the review process
 - Agreements and disagreements with other studies or reviews





Implications for practice

- Help understand evidence related to practice
- Not provide recommendations

Implications for research

- Evidence of treatment techniques & dose
- Direction for future research





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Questions?

Comments?

