Writing a Literature Review

Elements of a Literature Review

Abstract
- Brief overview

Introduction

Methodology
- Review of the literature

Results
- Your interpretation of the evidence

Discussion

Conclusion
- Brief summary

1

Abstract

Similar to a research/journal article
Key components to summarize
- Purpose
  - Clinical question/relevance of the review
- Methodology
  - Process of acquiring articles
- Results
  - Results of the systematic search
  - Consistent findings and/or gaps
- Conclusion
  - Final assessment of the overall evidence
2 Introduction

Reasons (or need) for the review
• Give an overview of the problem
• Target the audience

Clinical relevance of the problem
• Effect of this issue/problem on clinical practice or patients
• Describe, as needed...
  – Anecdotal evidence
  – Current practice methods
  – Popular components/interventions

Specific purpose of the review
• Last paragraph of the Introduction
• Be straightforward
  – “The purpose of this literature review is to...”

3 Methodology

Searching for the literature
• Targeted search
  – Names and dates of databases searched
• Search strategy
  – Keywords and phrases used

Selecting the articles
• Inclusion and exclusion criteria
  – Populations, interventions, or outcomes sought
• Topics of interest
  – Other criteria used to select final articles for review

Evaluating the evidence
• Study design classification
• Quality assessment

4 Results

Literature collection and selection
• How many collected?
• How many reviewed?
• Classification/quality results

Critical evaluation and synthesis
• Examine commonalities and/or trends
  – Describe consistent evidence in quality research
• Find contradictions and/or inconsistencies
  – Try to discern why (i.e., quality assessment)
  – Offer suggestions as to how studies may differ
• Identify relationships
• Locate gaps
5  Discussion

Examination of the evidence
• What does the evidence (in total) mean?
  – Interpret/explain the information found
• What are the limitations to the review?
  – Is the review comprehensive, complete?
Clinical conclusions
• Was the clinical question answered?
• Do the results support/refute current clinical practice?
• Does the information suggest a change?
Future directions
• What other information is needed?
• What research needs to be conducted?
Think about doing the review again
• What would you want to see in 5 years?

6  Conclusion

Summarize findings
• Restate the purpose of the review
• Describe the overall evidence
  – Is it strong? Weak?
• What are the main conclusions?
  – Similarities/contradictions
  – Obvious gaps or needed work
Clinical relevance
• What has been gained from the review?
• What is the “take-home message?”

Suggested distribution

Given a 20 page review, one might:
• Abstract – 1 page
• Introduction – 4 pages
• Methods – 2 pages
• Results – 8 pages
• Discussion – 4 pages
• Conclusion – 1 page
Example paper – Scoliosis

Abstract
- Purpose, methods, results, and clinical relevance all mentioned
Introduction
- Reasons for the review, clinical relevance, and purpose stated
- More detail regarding bracing options might have helped (figure?)
Methodology
- Search strategy detailed, particularly abstract analysis
- Three databases, plus JPO searched
- Keywords, exclusion criteria, and classification discussed
Results
- Overall observations mentioned, then individual articles reviewed
- Articles critiqued and included only as necessary (some w/ tables)
Discussion
- Commonalities and inconsistencies mentioned
- Future research ideas provided, clinical usefulness discussed
Conclusion
- Cautious, but fair summary of literature provided

Example paper – Depression

Abstract
- Purpose, methods, results, and conclusion noted briefly
  - Use of “meta-analysis” incorrect
Introduction
- Good definition of the problem of depression
  - Rationale for the review not justified enough (too short)
Methodology
- Search strategy detailed, great description of in/exclusion criteria
  - Three databases searched, but only vague description of keywords
Results
- Brief (too brief) discussion of search results
  - Overall observations mentioned 1st, then individual articles reviewed
  - Nicely divided into logical sub-sections
  - Articles not critiqued
Discussion
- General findings summarized
  - Limitations to review noted
  - Future directions, synthesis, not discussed (too short)
Conclusion
- Short summary, risk factors not noted (too short)

Example paper – Tissue Management

Abstract
- Objective, methods, brief results, and conclusions well and briefly described
  - Excellent abstract
Introduction
- Good general description and identification of a problem
  - Excellent rationale for the review
Methodology
- Search strategy briefly detailed, little description of in/exclusion criteria
  - Four databases searched, good description of keywords
Results
- Nice discussion of search results (great flowchart)
  - Nicely divided into logical sub-sections
  - Individual articles reviewed in good detail
Discussion
- Goals restated, general findings summarized
  - Excellent effort to synthesize the literature
  - Future directions only vaguely discussed
Conclusion
- Very comprehensive, well-written conclusion
Organization

Organization is Important

Organization
• Separate sections
  – Bold, italics, and/or underline to separate sections
• Start broad, and focus to details
Maintain a flow of information
• Each section of the review should be consistent
• Always remember the purpose of the review
Line up key review parameters
• Try to match up study similarities
  – i.e. apples-to-apples, oranges-to-oranges
• Look for common themes or gaps
However, do not just make a list
• You are the interpreter
• Consider both scientific evidence and clinical experience
• Assess the information and draw conclusions

Comparing Research

Potential comparisons among studies
• Overall questions asked
• Assumptions made
• Hypotheses/theories put forward
• Study designs used
• Populations studied
• Outcome measures (variables) selected
• Devices/interventions assessed
• Results obtained
• Researchers’ interpretations
• Proposed future work

Ultimately, up to the reviewer...you
Linking Words & Phrases

For trends and similarities
• also
• additionally
• likewise
• similarly

For contradictions
• however
• conversely
• on the other hand
• in contrast to

Tables & Figures

Tables and figures
• Can be used to show cross-study comparisons
• Sometimes, more effective than text

Correctly label
• Tables – above the table
• Figures – below the figure

Number and reference
• Number tables & figures
• Always reference in text

Properly cite and note significance
• Clearly cite studies being compared
• Note significant findings, such as an asterisk (*)
### Tables

<table>
<thead>
<tr>
<th>Functional Area</th>
<th>ESAR Foot</th>
<th>Percent of Subjects Reporting a Change</th>
<th>Percent of Subjects Reporting Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin problems caused by prosthesis</td>
<td>Flex Foot</td>
<td>61</td>
<td>28</td>
</tr>
<tr>
<td>Skin problems caused by prosthesis</td>
<td>Seattle Foot</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>Hip and knee shock and stress</td>
<td>Seattle Foot</td>
<td>70</td>
<td>74</td>
</tr>
<tr>
<td>Pelvic gait performance and awareness of load action</td>
<td>Seattle Foot</td>
<td>54</td>
<td>87</td>
</tr>
<tr>
<td>Balance and endurance</td>
<td>Seattle Foot</td>
<td>56%</td>
<td>61</td>
</tr>
<tr>
<td>Visual and balance</td>
<td>Seattle Foot</td>
<td>95</td>
<td>59</td>
</tr>
<tr>
<td>Skin problems</td>
<td>Seattle Foot</td>
<td>58</td>
<td>55</td>
</tr>
</tbody>
</table>

1. Menard (1989)  
3. * p < 0.05

### Figures

#### Ankle ROM During Walking Gait

- SACH: 43.9% Increase Over SACH
- Quantum: 40.0% Increase Over SACH
- Flex Foot: 93.3% Increase Over SACH
- Flex Foot: 60.0% Increase Over SACH
- Flex Foot: 53.3% Increase Over SACH
- Flex Foot: 16.1% Increase Over SACH
- Flex Foot: 81.6% Increase Over SACH
- Flex Foot: 73.3% Increase Over SACH

* p < 0.05

### Writing Style & Format
Technical Writing

The goals of technical writing
- Convey your information
- Be understandable
- Be accurate

Paragraph structure
- One topic per paragraph
- First sentence defines paragraph
- First-last sentences “linked”

Sentence structure
- Avoid run-on sentences
- Keep sentences to-the-point

Technical Writing

First person vs. third person voice
- First person (i.e. “we” or “I”)
  - Better for narratives
- Third person (i.e. “it,” “them,” or “they”)
  - Better for technical writing

Active vs. Passive voice
- Active = “Our results show…”
- Passive = “Results showed…”
- Passive voice vs. active voice
  - Passive accepted in scientific writing
  - Removes pronouns
  - Sounds objective

Technical Writing

Verb tense
- May change between sections
  - Methodology = past tense
  - Discussion = present tense
- Should be consistent within sections

Use of superlatives
- Rarely descriptive in scientific writing
  - Very, quite, fairly, rather, somewhat, relatively
- Most can be eliminated
  - Avoid using vague words (some, few, enough, etc.)
Examples - Voice

Original
“We decided to conduct a literature review to find information from various research articles which either justified or discouraged myoelectric prosthetic fitting for pediatrics.”

Revised
“A literature review was conducted to identify research which either supported or refuted the fitting of myoelectric prostheses in pediatric amputees.”

Examples - Voice

Original
“I performed a systematic search of available literature using the following online databases: PubMed, CINAHL, and RECAL.”

Revised
“A systematic search of available literature in the PubMed, CINAHL, and RECAL databases was performed.”

Technical Writing

Use of words
- Use of the word “significant”
  – In technical terminology, this means statistically significant
  – Opposite of significant is non-significant
- Less and fewer
  – Less refers to a collective (i.e., less data)
  – Fewer pertains to multiple items (i.e., fewer studies)
- Which and that
  – Generally, that is preferred to which
- Because and since
  – Generally, because is preferred to since
Examples – “significant”

Original
“We found that there is significant evidence which supports that the fitting of myoelectric prostheses for children to be beneficial.”

Revised
“Evidence from this review suggests that the fitting of myoelectric prostheses in children may be beneficial.”

Examples – “significant”

Original
“Peery, Klute, and Ledoux (2004) explored heat transfer mechanisms within the residual limb and prosthetic socket, and discovered the parameters that significantly affect this process.”

Revised
“Peery et al. (2004) explored heat transfer between the residual limb and prosthetic socket in order to analyze parameters that most affect heat retention, perspiration, and other potentially problematic conditions.”

Technical Writing

Use of language
- Use a technical style
- Transtibial vs. Below-Knee
  - Below-Knee is more casual
  - Transtibial is more modern, technical, anatomically correct
- Avoid colloquialisms (“lay-language”)
  - Phrases unsuited to technical writing
    - “dealt with,”
    - “jumped to the forefront,”
    - “looked at,”
    - “room for improvement,” etc.
- But…avoid using technical language just to be technical
- Use common sense to choose your words
Examples – “overly-technical”

Original
“The intervention was prescribed in order to effect a positive outcome in wound regeneration as indicated by the altered recovery period.”

Revised
“The prescribed treatment improved healing time.”

Examples – “lay language”

Original
“In recent years, myoelectric arms have burst on to the scene of prosthetics claiming to be an improvement to the traditional body-powered arms.”

Revised
“In recent years, myoelectric arms have become a popular alternative to traditional body-powered prosthetic arms, as they are believed to be more functional and less encumbering to patients.”

Examples – “lay language”

Original
“Prosthetic sockets are not currently made to deal with conditions such as temperature, perspiration, pressure, and shear which cause skin problems for the amputee.”

Revised
“Modern prosthetic sockets are not designed to accommodate problematic conditions such as temperature, perspiration, pressure, and shear.”
Citation & Plagiarism

Proper citation

Plagiarism
• What is plagiarism?
  – Use of words or ideas without proper citation
  – Taking words and phrases directly without quotation marks AND proper citation
  – Use of work that is not your own
• Other students, writing services, the internet, etc.

Proper citation
• What is proper citation?
  – Giving proper credit for ideas and words
  – Properly paraphrasing the source
  – Accurately distinguishing between your ideas and someone else’s

Notes on Citation

Direct Quotation
This void between anecdotal experience and scientific evidence is often acknowledged and even accepted in the literature, particularly in regards to prosthetic feet. “Most active patients subjectively prefer the dynamic response keel design to its predecessors although studies have yet to prove the dynamic response keel design to be significantly advantageous in improving ambulatory efficiency.”

References
Notes on Citation

Original journal article (as written in Hafner 2005)
The AMP (Gailey 2002) is a tool designed to assess the potential of an amputee to ambulate. It consists of 21 tasks which are ranked by a clinician. The AMP is available in two forms: the AMPPRO is designed to assess ambulatory potential of patients with a prosthesis, and the AMPnoPRO is designed to assess the potential of those without a prosthesis.

Original reference (as cited in Hafner 2005)

Your paper
There are many tools designed to evaluate an amputee’s functional ability. The Amputee Mobility Predictor is a 21-task evaluation tool used by a clinician to rank an amputee’s potential for ambulation both with and without a prosthesis (Gailey et al. as cited in [1]).

Your reference

Citation Style

American Psychological Association (APA)

• Alphabetized list
  – By first author’s last name
  – Up to 5 authors listed
  – After 5, use “et al.” (et alia)

• List appears after Discussions/Conclusions sections
  – “References”

• In text at location of citation
  – First time
  – Up to 5 author names listed, or et al. beyond 5
  – Subsequent times
    • First author and et al.

APA Citation Style Examples

Journal article

Citation

In Text
A recent review of qualitative outcome measures in the prosthetics industry (Hafner, 2005) suggests that few outcomes are able to discern differences among prosthetic components.
Citation Style

JPO Citations – based on Vancouver Style

• Numbered list
  – Prefaced by Arabic numerals: 1, 2, 3…
  – Up to 4 authors listed (et al. for 5 or more)
• Ordered as they appear in text
  – Number in round [#] or square [#] brackets
  – Superscript number may be used instead
  – End of citing sentence, after the period
  – Phrase may be cited to explicitly identify source
• List appears after Discussions/Conclusions sections
  – “References”

JPO Citation Style Examples

Journal article
Author AB, Author CD. Article title in roman type with no underline or quotation marks, capitalize first letter of title only. *Italic Journal Title* 1998;10(3):17-20.

Citation

In Text
A recent review of qualitative outcome measures in the prosthetics industry suggests that few outcomes are able to discern differences among prosthetic components.3

Citation Tips & Suggestions

When referring to research, you must cite
• Avoid vague references
  – “Studies have shown…”
  – “There have been studies…”
Avoid over-use of quotations
• Best used for emphasis
• Try to rephrase
• Incorporate your own thoughts and ideas
Use common sense
• Do not cite everything
• General knowledge does not need to be cited
• But…if in doubt, cite the source
Using Microsoft Word

Three ways to manage citations
- Endnote “cite while you write”  
  - Preferred  
  - http://www.endnote.com/training/
- Use WORD’s numbered list  
  - Brief example in class
- Manual citations  
  - Not recommended

Literature Review Details

Final literature review
- Scientific articles reviewed
- 12 – 20 pages  
  - Double-spaced  
  - Include two (2) completed peer checklists
- Due date: March 10

Presentations
- ~30 minutes of presentation time  
  - Both reviewers expected to speak  
  - Explain your review and your assessment  
  - 5-10 minutes for Q&A from class
- 3/3, and 3/10

Next Class

Next Class (2/24)
- Peer review  
  - One exchange session with a peer  
  - 2 total reviews (1 per author)

Assignment
- Each author bring a draft of your literature review  
- Double-spaced  
- Leave room for comments  
- Come prepared with specific questions  
- Complete checklist (attach to paper review)
Peer Review Checklist

Overall

Title/Abstract

Introduction/Background
Peer Review Checklist

Methodology

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Research questions are well-defined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Literature review is comprehensible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Classification scheme is presented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Inclusion/exclusion criteria are explained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Search parameters are well-described (i.e., keywords)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Review Criteria

No results are documented in the methodology.

The classification system is presented and explained.

The inclusion/exclusion criteria are explained.

The search parameters are well-described (i.e., keywords).

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Peer Review Checklist

Results

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contradictions and/or gaps are identified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Comparisons or common themes are presented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Brief overviews of relevant articles are given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Relevant articles are tabulated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Results of the classification are presented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Number of articles obtained and reviewed are given</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Review Criteria

Contradictions and/or gaps are identified.

Comparisons or common themes are presented.

Brief overviews of relevant articles are given.

Relevant articles are tabulated.

The results of the classification are presented.

The number of articles obtained and reviewed are given.

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Peer Review Checklist

Discussion

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Author has tried to assemble the evidence and draw conclusions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Next steps or suggestions for research are discussed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The overall body of evidence is discussed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. A comparison between results and current practice is drawn</td>
<td></td>
<td></td>
</tr>
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</table>

Review Criteria

The author has tried to assemble the evidence and draw conclusions.

Next steps or suggestions for research are discussed.

The overall body of evidence is discussed.

A comparison between results and current practice is drawn.
Peer Review Checklist

Conclusion

- The relevance of the review is presented
- The results are briefly summarized
- The goals of the review are re-iterated

Review Criteria

- The relevance of the review is presented
- The results are briefly summarized
- The goals of the review are re-iterated