Writing a Literature Review

Elements of a Literature Review
- Abstract: Brief overview
- Introduction: Review of the literature
- Methodology: Your interpretation of the evidence
- Results: 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
  - Articles not critiqued
Discussion
  - Goals restated, general findings summarized
  - Excellent effort to synthesize the literature
  - Future directions only vaguely discussed
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

- 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
- similar

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

Percent of subjects reporting a change when using an ESAR foot compared to CF

<table>
<thead>
<tr>
<th>Functional area</th>
<th>ESAR foot</th>
<th>Percent of subjects reporting no change</th>
<th>Percent of subjects reporting improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain$^\mathrm{1}$</td>
<td>Flex Foot</td>
<td>30</td>
<td>69 *</td>
</tr>
<tr>
<td>Pain$^\mathrm{2}$</td>
<td>Seattle Foot</td>
<td>16</td>
<td>84 *</td>
</tr>
<tr>
<td>Skin problems caused by pressure$^\mathrm{2}$</td>
<td>Flex Foot</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Ankle motion$^\mathrm{2}$</td>
<td>Seattle Foot</td>
<td>36</td>
<td>64</td>
</tr>
<tr>
<td>Hip and knee shock and stress$^\mathrm{1}$</td>
<td>Seattle Foot</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>Pelvis gait performance and awareness of foot action$^\mathrm{1}$</td>
<td>Seattle Foot</td>
<td>13</td>
<td>87 *</td>
</tr>
<tr>
<td>Balance and endurance$^\mathrm{2}$</td>
<td>Seattle Foot</td>
<td>56 %</td>
<td>41</td>
</tr>
<tr>
<td>Vertical thrust gain$^\mathrm{2}$</td>
<td>Seattle Foot</td>
<td>60</td>
<td>39</td>
</tr>
<tr>
<td>Skin problems$^\mathrm{2}$</td>
<td>Seattle Foot</td>
<td>55</td>
<td>45</td>
</tr>
</tbody>
</table>

$^\mathrm{1}$ Menard (1989) $^\mathrm{2}$ Murray (1988) * p < 0.05

Figures

Ankle ROM During Walking Gait

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

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 – “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 prosthetic foot 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 05 (March 09?)

**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
- 2/27, and 3/5

### Next Class

**Next Class**
- Peer review
- One exchange session with a peer

**Assignment**
- Bring a draft of your literature review
- Double-spaced (leave room for comments)
- Come prepared with specific questions
- Complete checklist (attach to paper review)