How to Read a Medical Journal Article

It has been brought to my attention that some of you may not know how to effectively read or interpret medical journal articles. This paper will help to not only decipher some basic terminology, but it will hopefully help you ask the correct questions when reading an article to assess for its validity. The orthopedic industry has been flooded with research articles, editorials, and case presentations that may not be either statistically valid or applicable. It is your job to filter through the fluff.

First, let’s define some basic terminology when we are talking about the different types of studies out there. Most of the time when I send you an article it will have the title, authors, when and where it was published, and a quick synopsis of the article. With that being said, here are some terms you should know. Some of these techniques are stronger than others.

- **Meta-analysis**: This refers to a way of combining data from many different research studies.
- **Systematic review**: A summary of clinical literature. There should be a critical assessment and evaluation of all research studies addressing the clinical issue at hand.
- **Cohort/Prospective Study**: Clinical research study in which people who presently have a certain condition or receive a particular treatment/algorithm over time and compared with another group of people who are not affected by the condition or treated with a placebo.
- **Case Report and Series**: A report on a series of patients with an outcome of interest. There is no control group and they may or may not describe comparative literature.
- **Editorials**: An opinion/response on a subject/procedure/etc presented by an expert in the field.
- **Retrospective/Case Control Study**: Collection of data from the past on a particular subject/procedure/etc in order to determine outcomes of technique/subject/procedure. There is no intervention and controls can be inadequate/incomparable.
- **Qualitative Study**: Research that derives data for observation, interviews, or verbal interactions. It focuses on the meanings and interpretations of the participants.
- **Quantitative Study**: Uses numerical analysis.
- **Randomized Controlled Trial**: Clinical trials that involve at least one tested treated and one control treatment with follow up in which the selected (patients in our case) is done at random.
- **Level of Evidence**: A method utilized in evidence-based medicine to determine the clinical value of a study. This can be specific to each profession. Within the orthopedic community the levels vary from 1–5 and are defined by the American Academy of Orthopedic Surgeons (AAOS). A chart is attached at the end of this paper.*

Now that you have the basic definitions of terminology used associated with medical (in our case Orthopedic) journal articles, you may be asking how to read these articles. The articles are broken up into basic sections: Abstract, Introduction, Materials/Methods, Results, Discussion,
How to Read a Medical Journal Article

and Conclusion. Not every article will have all of these sections, but most will. There can be subsections within each section.
The abstract will give you a quick synopsis of the article. This is not a replacement for reading the entire article. This aids in screening to see if the article is applicable to the subject matter you are trying to obtain. It can also give you some key information as to the level of evidence, methods, sample size, or strength of the study up front.

The introduction is just what it sounds like, an introduction to the subject matter. The author should present the hypothesis, goals, and reason for the study in this section along with some data that has already been published in the literature.

The Materials/Method section will instruct the reader as to how the researcher collected the data. This arguably is one of the most important sections of the paper. This should be all objective and opinions should not be present. This is a very important section. It can tell you if this is a well thought out, complete, bias, reproducible, and valid study. These are key things to Orthopedic surgeons; based upon your methods, can I reproduce your same results? The selection criteria and variables are in this section as well. Usually, this is the section that I poke the most holes in when it comes to a study.

The Results section presents the exact results from the method/materials section. There may be statistical analysis here along with numerous tables and charts. For our purposes, the specific statistical method is not necessarily important. In order to explain all the different types, you would need to take a stats class. You should look at the charts, grafts, etc. Please don’t skip over this; there is a ton of great data here.

The Discussion/Conclusion section gives you the authors’ interpretation of the data. Most of the time within this section, the author will compare their data with previously published data/the “gold standard” of care thus either proving or disproving their initial hypothesis. Also, within this section the author can offer up some limitations to their study, for example: sample size, single surgeon data, etc.

Below are some of my suggestions when reading a medical journal article, specifically for orthopedics.
-Read the title of the article, authors, and journal it came from. Some journals are more well respected than others and have a stricter article acceptance policy.
-Next read the abstract. I always ask myself, “Is this exactly what I am looking for? How can this help my practice/surgeon? Do I want to read the entire article based upon the abstract?”
-Read the Methods section. “Is this a strong or weak study? Is the author/surgeons presenting this study well respected? Is it reproducible? Is there a selection bias? Is there a surgeon bias (does the surgeon work for the company)? What did or didn’t they compare (example: ACL paper→did they mention graft selection, auto vs allo, same graft comparison, same approach comparison, etc)?” I take a TON of notes in the margins/highlight during this section.
-Now you can decide if this study is strong enough to read from the beginning. Go back to the introduction and start reading or move on.
-When getting to the results section, again, I am super active with highlighting/note writing, but I skip the tables until I am done with the section. I need to dissect out the information after they have provided it in written terms. Sometimes the tables will be a positive/negative addition to their points in the conclusion that they did not highlight. For example, if I am reading an article on return to sport after ACL reconstruction using a TR and the author focuses on football players, but my surgeon mostly treats soccer players, I want to know that information even if they did not highlight it in the results section but highlighted it in the table.
-Finally, I get to the conclusion which spells out the authors’ interpretation of their data and application into the orthopedic society.
-As an aside, I do actually look at the references. These can tell you other articles that pertain the subject matter you are looking for.

I really hope this helps you all with reading medical journal articles, specifically Orthopedic articles. Be an active reader!! I have also attached some references that can be helpful.
# How to Read a Medical Journal Article

Adapted from Study Designs. In NICHSR Introduction to Health Services Research: a Self-Study Course. [http://www.nlm.nih.gov/nichsr/ihcm/06studies/studies03.html](http://www.nlm.nih.gov/nichsr/ihcm/06studies/studies03.html) and Glossary of EBM Terms. [http://www.cebm.utoronto.ca/glossary/index.htm#top](http://www.cebm.utoronto.ca/glossary/index.htm#top)


Georgia State University Library: [http://research.library.gsu.edu/c.php?g=115595&p=755213](http://research.library.gsu.edu/c.php?g=115595&p=755213)

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## Levels of Evidence for Primary Research Question

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<tr>
<th>Levels</th>
<th>Types of Studies</th>
<th>Economic and Decision Analyses—Developing an Economic or Decision Model</th>
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| Level I | 1. Randomized controlled trial (a) Significant difference  
2. Systematic review of Level-I randomized controlled trials (studies were homogeneous)  
3. Systematic review of Level-I randomized controlled trials (with universally applied reference “gold” standard) | 1. Clinically sensible costs and alternatives; values obtained from many studies; multiway sensitivity analyses |
| Level II | 1. Prospective cohort study  
2. Peer-quality randomized controlled trial (e.g., <80% follow-up)  
3. Systematic review of Level-II studies | 2. Systematic review of Level-II studies |
| Level III | 1. Case-control study  
2. Retrospective cohort study  
| Level IV | Case series (no, or historical, control group) | No sensitivity analyses |
| Level V | Expert opinion | Expert opinion |

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1. All patients were enrolled at the same point in their disease course (inception cohort) with ≥80% follow-up of enrolled patients.
2. A study of results from two or more previous studies.
3. Patients were compared with a control group of patients treated at the same time and institution.
4. The study was initiated after treatment was performed.
5. Patients with a particular outcome (“cases” with, for example, a failed total arthroplasty) were compared with those who did not have the outcome (“controls” with, for example, a total hip arthroplasty that did not fail).