



How to write a scientific article

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The purpose of this article is to help osteopathic family physicians prepare a scientific article and show all the steps from the rough manuscript to the published paper.

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Medical writing is one component of the comprehensive skill set that medical school faculty members develop over many years. However, the vast majority of physicians have minimal or even no formal instruction in the discipline and art of medical writing. Yet, physicians rely on the medical literature as a primary source of new information that in turn affects how we think, how we practice, and, ultimately, patient care and patient outcomes. The development and honing of the skills necessary for writing and interpreting medical literature should be mandatory in both undergraduate and graduate medical education curricula. Ensuring a solid foundation in this discipline would allow the busy practicing physician to more efficiently keep abreast of the medical literature throughout his or her career.

In this document, the editors of *Osteopathic Family Physician* (OFP) have provided a brief introduction to authoring a medical article for the novice writer. The material outlined herein is meant to be relatively generic, allowing for submission to any medical journal. When specifics are provided, they relate to OFP requirements for publication. Most peer-reviewed journals offer easy access to submission requirements on their websites, and these often need to be strictly followed to ensure acceptance of a manuscript.

OFP Tip: The OFP "Guide for Authors" can be accessed at <http://ees.elsevier.com/acofp>.

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In an effort to present a streamlined approach to writing a scientific article, we will focus on the following key points:

- Select an article type
- Know the intended audience
- Choose a journal
- Know the journal requirements and communicate with the Editor
- Organize the writing
- Submit
- Expect revisions
- Revise and resubmit
- Ensure success and avoid rejection

When giving consideration to various medical journals, it becomes evident that certain publications provide a niche for a particular article genre. For example, the *Journal of the American Medical Association* (JAMA) is populated predominantly by original research articles. JAMA is an ideal resource to find the latest research on a specific topic but may not be the best choice to find a thorough review on the current treatment approach to acne. On the other hand, *American Family Physician* (AFP) is predominantly composed of short review articles focused on providing keys concepts for the busy practicing family physician. These journals tailor their content respectively, to appeal to a well-defined readership, each fulfilling a distinctively different agenda.

OFP strives to provide a varied selection of article types to meet the needs of the diverse background of osteopathic

family physicians. In every issue, the editorial committee strives to publish an original research article, at least one review article, and a case report. Additional material might include articles on issues such as medical education, health policy, and public health reporting.

Select an article type to write

This step is somewhat reflexive, because the author typically has an article loosely outlined in his or her mind when considering putting pen to paper. If one has completed original research, a paper will likely be submitted reflecting these efforts. Original research may represent the highest “level” article in the academic world; however, this form of medical literature may or may not be the most appropriate medium to communicate the message the author wishes to deliver to his or her audience.

For example, for many physicians the luxury of having someone else file through the medical literature and compose a concise summary on a disease or treatment may actually be more important. These review articles do the work of interpreting the available evidence and provide the practical “take home points.”

Finally, a case report, the description of an unusual clinical situation, often discussed in a narrative format, provides a description of an unusual presentation of a common problem or an unusual condition that is not typically seen in clinical practice.

If you are unsure how to begin, go to the next step—know the intended audience—to help decide the best way to communicate with your audience.

Know the intended audience

This may be the most crucial step. Who do you want to read your article and what do you want them to gain? For example, if the issue is an important bill up for Congressional vote, then you want to reach a wide range of physicians and the message needs to be disseminated quickly. In this scenario, a journal is probably the wrong format because most journals are working 6 to 12 months in advance and the bill will have come and gone before the article reaches publication.

You may want to reflect on where you go when you access the medical literature. You may also want to ask your colleagues what journals they read. Once you know who you want to read your manuscript then you can ask what medical sources they use. There are so many specialty journals today that many physicians may only look at one or two in a month. Knowing what your audience reads will narrow your choice of journals and may even narrow your article type.

OFP Tip: *The audience for OFP is primarily osteopathic physicians specializing in family practice.*

Choose a journal

Once you have determined who your target audience is and what journal(s) they read, we recommend that you review a couple of copies of the journal in question. What kinds of articles are they publishing? Have they already published an article like yours? These are very important questions to answer. You do not want to invest in developing and formatting your article if it does not have a chance at the journal you are selecting.

OFP Tip: *Review a sample issue of OFP online at www.osteopathicfamilyphysician.org.*

OFP Tip: *Review past issues for published article topics at www.osteopathicfamilyphysician.org/issues.*

Know the journal requirements and communicate with the editor

If the journal does publish articles like yours but has not published your particular topic, you may be in good shape. We suggest that you contact the Editor to determine whether your topic is of interest for this journal. You are not asking if they will accept your paper, but if they think the concept fits with the current journal editorial timeline. It is possible that a very similar article is already in the pipeline. Some journals will accept only articles that meet a specific call for papers. This is important, because it is plausible if you submit to a journal that only uses “A call,” you may not get reviewed despite writing an excellent article. However, if you contact the journal ahead of time, the editorial team may be willing to let you know whether your topic will be among a future call for papers.

It is important to remember that there are many reasons the editors may discourage submission of a particular suggested article. It may be that they do not like the idea, but it is also possible that they do not publish that kind of paper, or will soon publish a similar paper that would make a new submission redundant.

Once you know the editor is interested in your concept, it is critical that you review the guidelines for authors. Not following submission guidelines is a very common reason for having a paper rejected or not even reviewed. We will spend more time on this later. Read the instructions a few times and make sure you can meet each of the guidelines—these are not negotiable! Further, you may want to print them so you have them handy when you are ready to submit.

OFP Tip: *Run your article idea by the OFP Editor at shubrook@oucom.ohiou.edu.*

OFP Tip: *Review author guidelines at <http://ees.elsevier.com/acofp>.*

Organization of the writing

Once the content has been determined, the writer must consider the form of the article. Readability is essential. It is

a common temptation, when writing for a scientific journal, to use a complicated prose style and lots of jargon, but the reality is that a busy reader needs the information delivered in a simple and direct manner. This is not to say that the language should be “overly simplified”; in fact, writing text that is both streamlined and coherent requires a certain literary intelligence. But this should not be intimidating. A few simple pointers on technique may help the writer hone and simplify an otherwise convoluted article.

- Inform the reader of the topic at the very beginning of the piece. A physician does not want to have to do detective work to determine the gist of the paper. If the very act of reading makes the article more labor-intensive, it is likely that the article will be discarded or set aside.
- One idea, one paragraph. Even if the paragraph is only two sentences long, when the topic changes, the paragraph must change.
- Keep the focus narrow and specific. If it is an original research topic, the subject should be explicit, ie, “Osteopathic Manipulation vs. Physical Therapy in Treatment of Adult Males with Nondiscogenic Cervalgia” rather than “OMT for Cervalgia.” If it is a review article, be realistic about how much relevant literature can be packed into one article. It is not feasible to write a review article on “Diabetes Update” but it is possible to review “Initiation of Insulin in the Diabetic Child” or “Treatment Options for Diabetic Neuropathy.”
- Scientific writing protocol generally requires writing in the third-person perspective, ie, “the author reviewed 40 patient charts” as opposed to “I reviewed. . .”
- After completion of the article, read through it several times to determine whether a person who had never heard the topic before would understand it, assuming of course the reader had a medical education. Also, check for superfluous words or phrases. The more streamlined, digestible, and concise an article is, the more likely the editor will send it out for review.
- A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results, and the major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, references should be avoided, but if essential, they must be cited in full, without reference to the reference list. Also, nonstandard or uncommon abbreviations should be avoided, but if essential, they must be defined at their first mention in the abstract itself.
- Literature review: To offer something new to your readers, you must know what is already out there. Completing a comprehensive literature review is a critical step. In fact, it may help you to know if what you plan to do has been done already. For example, if you are writing a case report and you find 200 articles on the same topic, then it is likely not unique enough to publish.
- Typically, a case report would have less than 10 similar articles in the literature. A review paper, however, may

have a number of papers to build from. You may need to compile a series of articles to build your case for the review paper. Many review papers can have 30 or more references.

- If you have access to a reference manager, learn to use it before you write. Reference managers such as RefWorks and Endnote can streamline the bibliography process and makes reformatting for different journals extremely easy. If you plan to write on a regular basis, a reference manager is a wise investment.
- **OFP Tip:** *References don't need to be excruciating. Check out this citation maker resource at <http://www.citationcenter.net/ctool.php5>.*
- **OFP Tip:** *OFP Authors have access to the search engine Scopus. Use this resource. Scopus is the largest abstract and citation database of peer-reviewed literature and quality web sources with smart tools to track, analyze, and visualize research. Updated daily, it includes the abstracts and references of 15,000 peer-reviewed journals from more than 4000 international publishers, ensuring broad interdisciplinary coverage.*

Submission

When you are ready to submit your article, make sure you review the guidelines one last time. Many journals have an online submission process. It is important that you format your paper to match submission. For example, the title page with authors' names is usually a separate document. This allows for a blinded review. In addition, the figures and tables may need to have a line in the text where they should be submitted, but they too are separate documents for many journals. Often the journal will ask you to select Keywords for the article and define all abbreviations. Some journals even require that you suggest people who should review your article; and some allow you to select people who you do not want to review your article. This is intended to help prevent a conflict of interest. This is most important in research articles on highly specialized topics.

OFP article submission is handled exclusively online utilizing the Elsevier system. As the world's leading publisher of science and health information, Elsevier serves more than 30 million scientists, students, and health and information professionals worldwide.

OFP Tip: *Submit your manuscript at www.osteopathicfamilyphysician.org.*

OFP Tip: *First-time authors submitting for publication in OFP will need to select Register from the menu at the top and enter the requested information.*

Revisions are expected

Typically, responses to a submitted manuscript include rejection or denial (most common), revise and resubmit (next

most common), and accept (least common). When a manuscript is submitted, it goes through a series of steps that vary based on each journal's protocol for review. In general, the first step is review by the managing editor. This person makes sure that the paper meets submission guidelines. If the author did not follow directions, it may be rejected immediately and may never be reviewed.

If the manuscript meets the submission criteria, it will go to the Editor for initial review. This read is to determine whether the article is of sufficient quality to be published in the journal and to determine whether it warrants a peer review. The Editor wants to make sure the journal has a selection of excellent articles to review from, and to make sure the journal meets the needs of the readership. The Editor also does not want to waste reviewers' time. If there is no chance that the article will be published, the peer review is not needed.

Once the manuscript is approved for review by the Editor, it will be sent out for peer review. This is often the longest step in the process. Many journals struggle with having enough reviewers who have the time and expertise to provide a thorough and thoughtful review of papers. This is another reason why some journals allow authors to identify potential reviewers. If you are given the opportunity to select a reviewer, the journal may or may not follow your recommendation.

OFP will always have at least three peer reviews for manuscripts and will make certain that at least one of the reviewers is a content expert in that field. Reviewers essentially volunteer their time, so this process can often take 4 to 12 weeks to complete. Most journals use blinded peer reviews to limit conflicts of interest and to prevent the influence of reputation of the author as grounds for acceptance or denial.

Once the blinded peer reviews are completed, the manuscript will return to the Editor for review of the peer reviews. The Editor will try to collectively determine the wishes of the reviewers and translate that into a decision about the paper. It is unusual for the Editor to override reviewers but the editor may need to make a final decision if the reviewers recommended different outcomes.

OFP makes every attempt to honor the opinion of the expertise of the reviewers. Review of a scientific article is a very subjective process and the same article submitted to the same journal could have a different outcome based on who the reviewers were at the time. This is yet another reason that selecting reviewers who may know your topic may improve your chance of an informed review. The Editor will submit a collective decision regarding the manuscript.

If you get an acceptance letter—congratulations! This means that you have only minor edits that they want you to address or they will make for you. You will be expected to complete paperwork signing off ownership of the paper and complete any conflict of interest paperwork. Please remember: depending on the Editorial calendar of the journal, your acceptance does not mean your article will be published in the next journal. It may be published that year but some-

times it takes more than a year for an article to fit into the journal's publication schedule.

If your paper is denied, it is helpful to know why. Because most manuscripts are denied on first submission, the author should be prepared for this outcome and benefit from the wisdom of the first review of the paper. Having people read this who are not emotionally attached to the work can be a painful process. If you receive a rejection, read it once carefully and then set it aside for at least 48 hours so you can settle down and read the review carefully. Remember some authors do not even receive a review. If your article was reviewed, then it was good enough to ask other people to volunteer their time to read it.

Many authors are frustrated when they get a revise and resubmit letter. This letter is often worded such that it sounds like a denial. You may read something like "The manuscript cannot be accepted in its current form" or "The author must address the concerns of the reviewers before it can be considered for publication." This is really *good* news even if it does not sound like it. What the Editor is really telling you is that with a bit of work, your article can be accepted for publication and, further, that the work is good enough for the Editor to review it again or even send it back out for review.

OFP Tip: *Want to know the status of your article at every stage? You can track accepted articles at www.elsevier.com/trackarticle and set up e-mail alerts to inform you of when an article's status has changed.*

Revision and resubmission

Again, it is important to read the reviewers' comments carefully and then set the paper aside and come back to it after you are calm and prepared to respond objectively. You definitely want to review each comment and respond to each. It is often assumed that you will make some adjustment to each comment, but do not assume that the Editor wants you to yield to every reviewer comment. When you do resubmit, you should send a letter to the editor outlining each of the reviewers' comments and your response to each.

Depending on the nature of the review, the Editor may send it back to the same reviewers to determine whether you addressed their concerns. However, some journals will send the "new manuscript" to a new set of reviewers to see how the new document stands up. This can be difficult because these reviewers may select different things to focus on and may even want things different than the first set of reviewers.

OFP tips for successful OFP article submission

OFP Tip: *Audience for OFP is osteopathic physicians specializing in family practice.*

OFP Tip: Review sample issue of OFP online at www.osteopathicfamilyphysician.org.

OFP Tip: Review past issues for published article topics www.osteopathicfamilyphysician.org/issues.

OFP Tip: Run your article idea by the OFP Editor: shubrook@oucom.ohiou.edu.

OFP Tip: Review author guidelines at <http://ees.elsevier.com/acofp>.

OFP Tip: When submitting to OFP, the images and charts are uploaded separately, so save them as separate image files.

OFP Tip: Submit your manuscript at www.osteopathicfamilyphysician.org.

OFP Tip: First time authors submitting for publication in OFP will need to select Register from the menu at the top and enter the requested information.

OFP Tip: References don't need to be excruciating. Check out this citation maker resource at www.citationcenter.net/ctool.php5.

OFP Tip: Use a PC. Macs are notorious for Elsevier access issues.

OFP Tip: OFP Authors have access to Scopus. Use this resource. Scopus is the largest abstract and citation database of peer-reviewed literature and quality web sources with smart tools to track analyze and visualize research. Updated daily, it includes the abstracts and references of 15,000 peer-reviewed journals from more than 4000 international publishers, ensuring broad interdisciplinary coverage.

OFP Tip: Want to know the status of your article at every stage? You can track accepted articles at www.elsevier.com/trackarticle and set up e-mail alerts to inform you of when an article's status has changed.