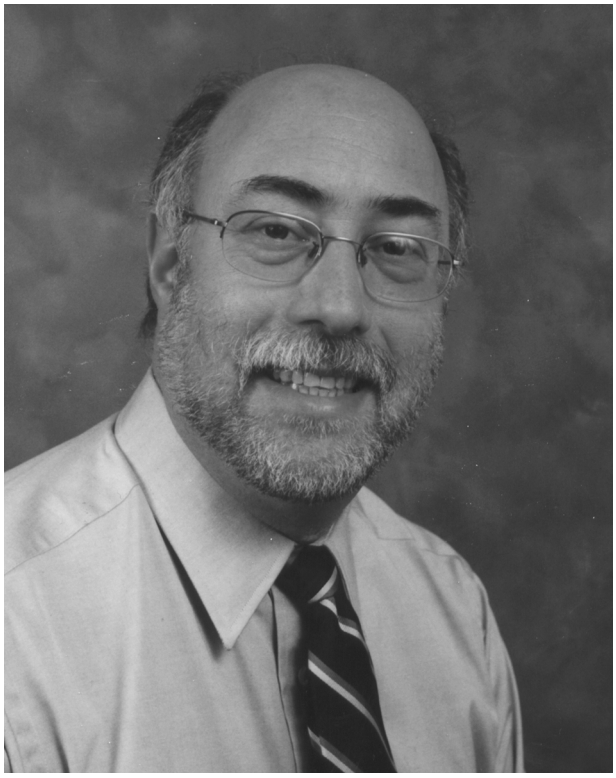
Open access publication is growing in importance

Dr. Dana J Lawrence, DC*



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News from Australia that the journal *Chiropractic and Osteopathy* has been redeveloped as an online publication through BioMed Central, with all attendant privileges including immediate inclusion in PubMed Central, demonstrates how much the nature of scientific publication has changed in just a short period of time. For its entire history, the *JMPT* has been the only scientific journal published by and for the chiropractic profession to ever have been selected for inclusion in *Index Medicus* (which is not to sleight the inclusion of *Chiropractic History* in the archival/historical section of PubMed). Yet it will no longer be alone in achieving this status, which is also an acknowledgement about how great an impact open access publication is having.

What is "open access" and what are its implications? One answer is rather pragmatic; open access is a means to provide access to the scientific literature to anyone with a computer and an internet connection, at no charge to the user.[1] Thus, anyone may access the information, which is stored in a central digital repository (i.e., the Public Library of Science, BioMed Central) and use that material for scholarship, teaching or personal investigation. And another explanation of the answer is that "open access" is simply a different business model for publication, one which shifts the costs for use onto those who publish the material from those who read the material. As one can thus see, impetus for this came in part from a desire by policy makers and legislators to see that those who fund scientific research (the public) have access to that research without having to pay for it yet again by means of a subscription price. While the cost of subscribing to journals such as *JMPT* or *JCCA* remains relatively modest, the costs for journals such as *Spine* or in the physics literature can be many times those fees, making it hard for the average scientist to afford the journal, the average library to subscribe to all the journals it feels it should in order to represent its scholarly constituency, and to the reading public, who has already paid for that work by means of their taxes.

That is the basic idea. While the *JCCA* has been freely available online to all for several years now, the *JMPT,*

* Editor Emeritus, *Journal of Manipulative and Physiological Therapeutics*
Associate Professor
Palmer Center for Chiropractic Research
Palmer College of Chiropractic
741 Brady Street, Davenport, IA 52803
Phone: 563-884-5302; Fax 563-884-5227
dana.lawrence@palmer.edu

like many other scholarly journals is not at present an open access publication. You must subscribe to the journal, either through a personal subscription or through professional society membership dues. Only subscribers then have complete access to a journal's online version; an outsider does not. In the business model used by Elsevier, who is the publisher of *JMPT* and many other journals, costs for printing and running the journal are generated by subscription fees, which go to pay for all costs associated with production, pay a royalty to the journal owner, and pay a smaller royalty to Elsevier. Since this is a for-profit operation, Elsevier looks for possible revenue streams, which include subscription fees, licensing fees (i.e. permissions to reprint), fees for making copies of author reprints, advertising, etc. And in exchange for assuming the cost of publication, journals ask you to transfer copyright for your work exclusively to the journal, which then controls its future use (though usually giving you at least the right to use your own work in teaching or other writings). Of course, should the subscriber level fall to uncomfortable levels, as a business we would expect the publisher to suspend operation of the journal; that is, to end it. This has been the fate of a number of good chiropractic publications whose subscriber lists failed to grow.

What of an open access publication? According to the Bethesda Principles of April 2003, an open access publication must meet 2 conditions: "(1) The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use; and (2) A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository)."[2]

The benefits to open access are apparent, ease of access being paramount. Using open access, anyone with a modicum of search skills can find and use your work, and need not go through a passcode-protected gateway to do so; it is there "for the taking." Thus, dissemination is maximized to the widest audience. Everyone has access, and so scholars around the world can easily find and use your work. As most of us are aware, the process of doing searches for information is both time consuming and frustrating. We go to PubMed and run the search we have carefully developed, we locate information and then we find that much of it is not available online, so we have to either order it (at a cost) or run to the LRC and spend time finding specific issues from years ago, which is often a hit or miss prospect, and so we never do get all the papers we really want, at least not easily or cheaply. For the user of information, it will make it possible to easily find information without having to incur the substantial costs of numerous subscriptions; for science libraries, it will reduce the astonishing fees they have to pay in order to provide coverage for their users, which is known today as the "serials crisis."

In opposition to this, scientific publishers are nearly united in their opposition to open access. I will shortly delineate why, but before I do I should provide information on the business model used in open access. In short, it uses some variation of an 'author pays' model- publication charges to authors, institutional membership charges, grant support charges, etc. The fees are set to be modest, ranging in our discipline from $500 to $1500 per article. It is felt that in scientific research, the funds necessary for open access can be built into the grant money for that research, thus providing the taxpayer who funded that in the first place ease of access. As the Public Library of Science states in its report, "Finally, the most direct way to sustain open-access publication in the long term will be reliant upon funding bodies recognizing that open access to research maximizes the impact of the research they are subsidizing, is a valid research expense, and therefore must be included in grant funding."[1] Further, the report goes on to note that if the major funders of research find that this model is an important component of a future successful proposal and are willing to commit to making funds available for this purpose, the market will then react by developing creative publication models, which is already beginning to happen.[3,4] Without going into further detail, the obvious shift here is from end-user subscription fees to

author publication fees. It is simply another business model, but one with significant ramifications. And it does seem to fly in the face of our expectations. I can hear some reading this say, pay to publish? You must be kidding! But consider; if you have grant funding and you are truly interested in your article reaching the widest audience, would a $500 additional fee built into your grant to make that happen be worth consideration? So that anyone, at any time, can use your work? Compare that to the status quo, where you need a subscription to the journal to get the article, and the frustration you have when you find you cannot get it without traveling to some distant location to find a physical copy and make your own copy of it, if the journal is there to begin with. I can attest that copies of most chiropractic journals regularly disappear from the NUHS and Palmer College Learning Resource Centers. Only some material can be retrieved by logging onto PubMed, but much cannot.

Let us look for a moment at the Public Library of Science (PLoS). The PLoS currently charges authors $1500 per accepted article. This fee is used to pay for the costs of having the article sent for review, for technical editing to prepare it for publication on the PLoS website, and for electronic distribution. Once done, the article is available both on the journal website as well as on the PubMed Central website (an example would be that when *Chiropractic and Osteopathy* published a paper, you could retrieve it either from the journal site itself or from, in this case, BioMed Central, which is a corollary operation to PLoS). The first journal to use this model was the *Journal of Clinical Investigation*, which published in BioMed Central. As Delamothe and Smith state: "While it is commonly labeled 'author pays' to differentiate it from the traditional 'reader pays' model of journal subscription, it's mostly the authors' funders who pick up the bill. In fact, 'readers' are mostly academic institutions. So the same institutions may pay with open access but the beauty for them will be that they should pay less as well as achieve universal access. The 'losers' will be publishers, particularly commercial publishers such as Reed Elsevier."[5]

There are obvious and significant challenges to open access. The PLoS background paper lists several concerns, including how journals achieve sustainability, how quality control can be assured given the probable pressure to publish to remain viable, how author rights are to be protected, and how can a critical mass of authors be achieved to help sustain this model into the future.[1] With regard to sustainability, all published papers will be archived in central repositories, such as PubMed Central, BioMed Central and INIST (Institut de l'information Scientifique et Technique, http://www.inist.fr). Quality control arises from the pressures of competition; that is, authors will select those publications in which they perceive high quality and rigor, where selection criteria are rigorous, and where the review board is comprised of qualified individuals with appropriate track records in their field. As this develops, impact factors can be developed for these journals, and may then play yet another role in the selection process for potential authors. With regard to the protection of rights, I should note that copyright protects the journal, not the author; the author has given rights to his or her paper to the journal. While copyright may protect the journal or publisher from unauthorized duplication or use, it surely does not protect the author, who at times has to ask permission of the journal to use that very same work. The author's interest is in having the work disseminated as widely as possible; the publisher's interest is in protecting its investment, earning revenue, and building the subscriber base (I do not mean to imply that is their sole concern, for it is not. Publishers also want to publish high-quality research. But that alone is not enough, as witness the demise of several quite good chiropractic journals in the past few years). Finally, achieving critical mass may be easier to overcome than we might expect. Let me offer this thought. At present, the "lag time" for publication in a standard scientific/chiropractic journal may be approximately 12 months from date of acceptance. If you are now offered a second option, one that is indeed indexed in PubMed and which can have your paper 'published' online within 3 months of its submission, would that be a viable option to consider? When your work will then also be immediately available to scholars the world over at the same time? I do not think it will be hard for a critical mass to be achieved, and already BioMed Central, for example, includes 107 journals.

Another concern about open access is monopoly. An interesting letter to the editor at *BMJ* delineated the problem nicely, by noting that the letter writer was editor of a small but rigorous open access journal which had recently begun imposing a $500 publication fee, but who felt threatened by PLoS and its huge monetary backing – $9 million – and who also felt that the PLoS ran the risk of accidentally destroying what it meant to create, namely

open access. His final comments resonate: "I wish foundations and scientists (peer reviewing and writing for journals) supported groups of scientists taking publishing into their own hands by using the web, rather than supporting megalomaniac organizations that aim to centralize and dominate. Open access has been made possible through the internet, and the internet is a wonderful decentralized medium. Let's keep it that way. We are just trying to free ourselves from the oligarchy of large publishing houses."[6] Note here that the concerns being raised are financial; PLoS is the giant gorilla of open access, with substantial resources behind it as well as many notable scientists and editors. It therefore poses a threat to the sustainability of smaller publications, much as open access overall poses a threat to the medical/scientific publishing companies.

Indeed, Elsevier (one of the world's largest medical publishing companies) has prepared a response and commentary on the concept of open access.[7] Elsevier argues that the current worldwide system of scientific, technical and medical (STM) publishing has evolved over hundreds of years and serves the scientific and medical communities quite well. They note that there are over 2000 STM publishers worldwide, producing over 1.2 million new peer-reviewed papers annually after experts have vetted them for publication. They further go on to state that the investments that STM publishers have made in electronic technologies are delivering dramatic improvements in productivity, including access, usage, functionality and per article cost decreases. Access in the UK is essentially guaranteed for researchers and academic as a result of the fact that most UK Higher Education Institutions have access to nearly all Elsevier journals, arising from licensing agreements. Elsevier has found that from 2001 to 2003 the number of researchers in the United Kingdom who downloaded articles at least once per month more than doubled (from 145,000 to 360,000) while the total number of articles they downloaded rose from 4.4 million to 13.3 million, as measured by use on *ScienceDirect*, Elsevier's own gateway instrument. Elsevier sees this as an indication of real growth in user benefits, which is an indication of ease of functionality. It is now possible for users to access articles from work or remotely, to perform complex searches in *ScienceDirect*, to retrieve full articles, link to other articles cited in the primary source, to export search results to local databases such as Refman, and to receive alerts on new article releases. This is similar to the function of a standard database such as PubMed. Finally, the cost per article for customers for a retrieved article has fallen to around $3.00 in 2003 from close to $10.00 in 2001.

Elsevier argues that an author-pays model risks penalizing researchers in countries with high research production, and this will prove a burden on the institutions that are supporting the research. Other concerns they raise include the same issue of quality control already noted above; they fear that there will be pressure to see increased numbers of publications simply based on the fact that the more you publish the more revenue you bring in. They note that the model has not yet proven its long-term viability, noting that the costs authors are asked to pay at present do not fully cover all costs involved in the production of an open access journal. They fear that open access, because it requires use of a computer, will impair the ability of researchers and individuals in less developed countries from accessing the work at all; only 11% of the world population uses the internet.

It is beyond the scope of this paper to address these concerns, though I think it apparent that given the comment that there are 1.2 million or so new articles published every year, there is no possible way for any researcher to locate all possible articles of relevance or to pay the costs necessary to obtain them. This would argue against the Elsevier position.

Nonetheless, a number of issues collide. Science serves the public good, and greater dissemination and distribution of science fosters that goal. The World Health Organization is attempting to provide journal content to all countries with GNP less than $1000USD, as few in those countries have the funds to get that content. Open access would certainly help that goal, though building computer literacy and infrastructure is also needed.[8] What is certain is that studies are beginning to show that providing online access does improve subsequent use of published findings by other researchers, by a factor of 4.5.[9]

Like any new technology, there are concerns and challenges, and much that will be modified and revised. Open access in some form or another is here to stay. It may be of substantial benefit to the chiropractic profession. While for many years the *JMPT* has been the single journal within the chiropractic profession included in Index Medicus, which has been a signal of rigor and an impor-

tant consideration for authors in selecting a journal, the development of other databases which more fully cover chiropractic has made it easier for individuals to locate chiropractic research. One can, for example, use MANTIS or CINAHL, or log on to EBSCOHost via a chiropractic college library. Information retrieval has never been easier, or harder. Thus, our options increase, and our ability to send our research out to the greater scientific community does as well. I welcome this change, as it ultimately will work to the benefit of the profession.

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