

THE FUTURE OF THE ORTHOPAEDIC JOURNAL CLUB: A NEW CONCEPT OF PEER-REVIEW IN THE INFORMATION AGE

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HISTORY

Sir William Osler is credited for establishing the first medical journal club in 1875 at McGill University¹. He carried on this tradition when establishing the Book and Journal Club at Johns Hopkins University. The original genesis of his journal club was “for the purchase and distribution of periodicals to which he (Osler) could ill afford to subscribe as an individual.” This flourished into an organized and established means for reviewing the latest medical research and to help develop new texts for the medical library at Johns Hopkins University.

The development of journal clubs across all medical specialties further developed and became common place starting in the 1920’s and 30’s. This progression has advanced to modern times where journal clubs are considered an integral part of graduate medical education across specialties. A recent study by Greene WB revealed that journal clubs are near universal in orthopaedic surgery residency programs². Greene surveyed all orthopaedic residency program directors in the United States and Canada and found that 147 of 149 respondents (99%) had regularly scheduled journal clubs with the primary goals of (1) teaching residents how to evaluate scientific articles, (2) instilling habitual reading of scientific journals and (3) facilitating learning of the current literature. These goals have been similarly expressed in other studies examining the topic.

CURRENT TRENDS

The development of journal clubs has paralleled the growth and refinement of the medical literature and development of the paradigm of evidence-based medicine. Many medical journals arose after the development of medical societies and initially were a means for disseminating accounts of society meetings. These rapidly flourished into peer-reviewed publications and the medical literature as we know it today.

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Peer review, or refereeing, is the process of careful impartial analysis of research papers by experts in that particular field. This process is paramount to ensure that published work meets accepted standards. It is a rigorous process of critical analysis to ensure that any published research meets standards in various domains including the protection of research subjects, methodologic protocol, and accuracy and validity of conclusions reached. Essentially, the process of peer review safeguards the sanctity of the scientific literature.

However, there has been criticism of the peer review process. Although all reviewers are experts in their field, the decision to accept manuscripts for publication is often the decision of a few individuals. In most scientific publications these reviewers act independently, are not aware of the identities or evaluations of the other reviewers, and the decision for publications is not often consensus-based. Other pragmatic issues have been the perceived “bottle neck” of publishing and disseminating new research ideas given the current process and limited resources to maintain the process of peer-review. Although different formats exist for the procedure of accepting or denying works for publication, the commonality is that the current process of peer review is essentially based on the opinion of a work’s merit of a few reviewers.

Similarly, there have been several studies that have discussed difficulties with the traditional journal club and the effectiveness of journal clubs in achieving their academic purpose. Teaching critical appraisal skills has been often stated as an important objective in various medical journal clubs^{3,4,5,6}. However, there have been few studies that have objectively proven that these goals are accomplished. Stern et al. in a study of 62 internal medicine residents found that the objective assessment of critical appraisal skills did not correlate with prior journal club experience⁷. Langkamp et al. found no change in knowledge of clinical epidemiology and biostatistics after pre and post object testing in a control and intervention group (specific didactic sessions emphasizing methodological issues at the journal club)⁸. Linzer et al. however demonstrated contradictory evidence showing that self-reported habits and knowledge of epidemiology and biostatistics were improved after participation in a journal club⁹.

Adequate participation in journal clubs by faculty and residents can be a challenge as well. Several studies have shown that positive support by the program director, having a designated leader of the journal club and mandatory attendance has been cited as factors related to success^{5, 6,10,11,12,13}.

Full participation however can be difficult due to clinical responsibilities, time constraints, as well as the need for adherence to work hour regulations. With the development of the World Wide Web there has been an explosive dissemination of medical knowledge not only to the medical community but to the lay public as well. Recent reports show that 25.6% of the world's population, or 1,733,993,741 persons, utilize the internet¹⁴. With the development of Pubmed and with most journals having on-line subscriptions there has been a tremendous increase to access for all practitioners. The role of the internet has truly facilitated the movement towards evidence-based practice as it has improved the access to these peer-reviewed publications and increased communication amongst practitioners. Even more so, the internet has created a new vessel for the exchange of ideas and a new found connectedness not only in the medical community but in the world at large. Websites such as Twitter and Facebook have facilitated this connectedness. Blogs (or the contraction of the term "web log") is an example of a particular format that has revolutionized connectedness and the exchange of opinions on the internet. Blogs come in many forms but fundamentally they allow readers of a blog to leave comments in an interactive and real time format about a particular subject. This format has facilitated the transmission of ideas as they are often conducted in an anonymous fashion.

THE FUTURE

We feel the internet can revolutionize our current understanding of peer review and the concept of the medical journal club. This would in turn have vast implications regarding the movement to evidence-based practice. In our discussion we illustrate the development of our website, www.orthopeers.blogspot.com, as an example of the internet's potential to these ends and as a focus point to discuss the issues regarding on-line discussion of the orthopaedic literature.

www.orthopeers.blogspot.com is a freely accessible website developed by the authors for the review of the orthopaedic literature. The website is updated monthly with the most recent publically available titles and abstracts published in *The Journal of Bone and Joint Surgery (Am)* (with links to the full articles and access via paid subscription to *The Journal of Bone and Joint Surgery*) and allows users to openly comment in blog format on the merits of the published papers in a free and anonymous fashion. This format encourages active real time discussion on the validity, clinical applicability and usefulness of the published work.

This new format for discussing the orthopaedic literature revolutionizes the concept of peer review in the information age. The use of the internet allows the evaluation of a paper's merit to be judged not solely by a few reviewers on the editorial board of medical journals but instead collectively by the orthopaedic community as a whole, creating a new concept of "peer review." Current methods isolate the reader, and this website opens up an entirely new approach to shared-learning. Although the current literature is placed through a rigorous review process, published articles are not discussed in a public

forum to enhance understanding, stimulate questioning and challenge data/conclusions outside of small group discussions. Once published, very few articles, outside of those presented at national meetings, have a chance to be discussed on a national or international level being limited by geographic boundaries. The on-line format gives an equal voice to all levels: from the orthopaedic surgery intern at a small community residency program to the orthopaedic chairman at a high power academic institution. Its format allows for all discussants to openly voice questions and infuse new perspective and ideas. In addition, this format gives the authors of the scientific manuscripts themselves the opportunity to give additional insight and discuss issues not present in the published manuscript. It similarly allows authors to gain valuable feedback and analyze critique of their published studies.

This raises the question of how one defines a "peer". We feel that this is an evolving definition. For the submission of manuscripts for peer-reviewed publication this can only be defined as a fellow orthopaedic surgeon in a particular field, experienced in critical review of research studies. But how does this apply to the orthopaedic internet community and determination of the clinical usefulness of a published research article? In this case, is a peer defined as a handful of experts in a particular field sitting on review boards or is it defined as anyone who is willing to take the time to critically examine the literature and voice a meaningful insight? We would argue that the definition of a peer in this case is not mutually exclusive and both definitions have substantial benefits to offer. How much weight is given to these different sources is for you, the orthopaedic community, to decide.

The strength of this project and usefulness to the orthopaedic community is based on one simple concept: participation. As with any journal club or group discussion the inherent benefit is based on participants actively viewing their opinions and sharing ideas. We have created an on-line orthopaedic journal club that allows for true interactive real time discussion without limitations of registration or subscription. Our website and format, similar to all blogs, is an open discussion with its inherent advantages and disadvantages. This can be a double edged sword however as some opinions may be uneducated, misinformed and stray from the intended goal of critical analysis of the published research. We however have accepted that to truly foster open discussion that no censoring should be performed. We feel the on-line anonymous format will create a secure environment which will promote creative and innovative discussion. The development of ideas and progress to a higher understanding can only be achieved if freedom to express those ideas is guarded. The staff of www.orthopeers.blogspot.com, functioning as moderators, may on occasion redirect discussion to refocus on the primary objective of critical appraisal. As always the old adage "you can't believe everything you read" applies not only to printed material but to the internet as well. We feel that users of the internet are savvy enough to formulate their own opinions and individually weigh the merits of other opinions. The acceptance of the idea that peer-

review by a few reviewers validates the worth of published research is akin to the concept of “father knows best.” Although formal peer-review acts as a screen to select only high-quality studies for publication we as consumers know better to accept a paper’s worth based solely on publication status.

This new concept of peer review does not relegate the editorial boards of the major peer-reviewed journals but instead places a greater responsibility on them to protect the integrity of the orthopaedic literature. A danger that lies ahead in the internet era is if investigators post their research studies, regardless of peer review or validity of research, on blogs and individual websites. Heckman JD addressed this issue as early as 2001 in a symposium piece for *The Journal of Bone and Joint Surgery*¹⁵. The danger is that this “uncertified” research will be freely available on the internet and can muddle the integrity of the peer-reviewed literature. A greater risk is that poorly designed & performed research studies published on the internet may reach invalid conclusions that may adversely influence patient care. An insidious example of tampering and direct attack on the sanctity of the peer-review process was performed by the pharmaceutical company Merck in 2002. Merck established and funded the now defunct Australasian Journal of Bone & Joint Medicine. According to *The Scientist*, Merck paid an undisclosed sum to Elsevier (a widely used publisher of scientific journals) to produce several volumes of a journal that gave readers the impression of a peer-reviewed journal¹⁶. The articles presented contained only reprinted or summarized articles most of which presented data favorable to Merck products. This false peer-reviewed journal appeared to function solely as a marketing tool with no disclosure of company sponsorship. In the aftermath several medical experts who were unknowingly included in the honorary editorial board of this publication came forward stating that their consent was never obtained. Finally in May 2009 Michael Hansen, the CEO of Elsevier’s Health Sciences Division, released a press statement saying, “It has recently come to my attention that from 2000 to 2005, our Australia office published a series of sponsored article compilation publications, on behalf of pharmaceutical clients, that were made to look like journals and lacked the proper disclosures. This was an unacceptable practice, and we regret that it took place”¹⁷. This further illustrates the role of peer-reviewed journals such as *The Journal of Bone and Joint Surgery* as guardians of the orthopaedic literature. The potential for anyone to post uncertified research on the internet or create false journals makes the editors of peer-reviewed journals gatekeepers to quality research studies that have passed rigorous analysis.

Our website promotes this protection of the literature and our field by allowing an open forum discussion whereby surgeons from all perspectives (in training, generalists, subspecialists, academic or community based) have the new ability to ask questions to better understand the exponentially increasing amount of data published. Unlike other websites, we do not summarize published research as this potentially introduces

bias. Instead we post the abstracts with links to www.ejbj.org so that readers can obtain the full length articles by paid subscription and come to their own conclusions. With direct links offered to *The Journal of Bone and Joint Surgery* for each article and the appropriate copyright notifications posted on the site we avoid any copyright infringements. Furthermore, we encourage readers to fully explore the full length articles so that they can make meaningful comments on the blog. We feel that openness, transparency and the ability to discuss current research will only strengthen our understanding, leading to enhanced patient care delivery.

Our website further expands the concept of the journal club. Our blog format allows reader’s access to many different viewpoints from national and international sources and various levels of expertise. Instead of taking published research for face value it allows an instrument for each reader to weigh other opinions regarding the work’s validity outside the boundaries of small, once-monthly local journal clubs. This will allow a practitioner to make a more informed decision on whether conclusions reached by researchers should influence their clinical practice and the treatment of individual patients. This is the essence of evidence-based medicine. The strength of evidence-based practice is directly proportional to the strength of the evidence. Similarly our new concept does not relegate the importance of journal clubs at individual institutions. We hope that it instead enhances your individual experiences. We hope that you will find new perspectives on our on-line blog and bring these ideas to enhance your group discussions. Furthermore, after your individual journal clubs we hope you will post your groups perspectives and thoughts for all to share. Our format allows for participation in discussion at any time and is not limited by set meeting times. In addition, it allows for discussion of more journal articles that may be possible in the allotted time at individual journal clubs. Although we can’t offer a warm meal (a factor shown by Greene to improve satisfaction and attendance) we hope the breadth of discussion will make up for this fact and offer “food for thought!”

We as a community of orthopaedic practitioners must be on the forefront of technology utilization in the information age less we risk being left behind. The use of the internet as a tool for open discussion of the peer-reviewed literature will only increase the value of peer-reviewed studies and publications but will also strengthen our understanding leading to enhanced patient care delivery. We encourage the orthopaedic community to join on-line discussions wherever they may be. We hope that our website will spur the development of similar websites to review other orthopaedic subspecialty journals further creating more communities within our profession. We challenge the old adage “you can’t believe everything you read” by substituting with a new one, “you can’t believe everything you think.” Open discussion will not only bring us all a better understanding of the value of peer-reviewed studies but will increasingly bring the vast orthopaedic community closer.

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