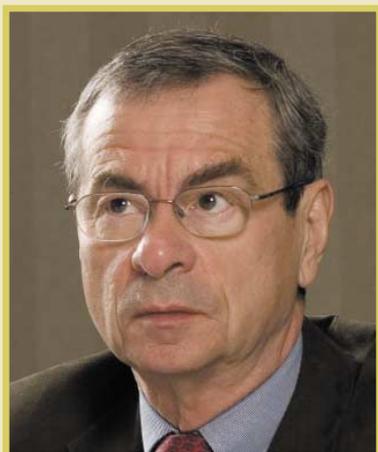


Current and Future Orthopedic Research: Views of Chief Editors of Leading Journals



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Recent advances in bioscience at the molecular level and research methods have brought with them a dramatic growth in the volume of medical research conducted at various levels in ever-diversifying specializations. Orthopedics is, of course, no exception; attempts to further explore this therapeutic area have resulted in remarkable progress, with state-of-the-art research in orthopedics now embracing molecular and genetic science, bioengineering, and large-scale randomized comparative clinical studies.

International peer-reviewed journals are a major vehicle for dissemination of the latest research findings. In this roundtable discussion, the Editors-in-Chief of two leading orthopedics journals express their views on recent developments in and future prospects for orthopedics research. Valuable advice on increasing a manuscript's chance of acceptance by international peer-reviewed journals is also offered.

Differences between orthopedics research environments in the USA, Europe, and Japan

Kawaguchi: Dr Buckwalter, Dr Lohmander, welcome to this roundtable discussion held to coincide with the Osteoarthritis Research Society International (OARSI) World Congress on Osteoarthritis (OA). This year's discussion is titled "Current and Future Orthopedic Research: Views of Chief Editors of Leading Journals." Today, our aim is to explore the current status and future prospects of orthopedic research from a global perspective, drawing insights from the Editors-in-Chief of two leading international journals in the orthopedic field, the *Journal of Orthopaedic Research* and *Osteoarthritis and Cartilage*. It is also hoped that this discussion will provide guidance and inspiration to young Japanese orthopedists who wish to publish their research in the international forum.

Before starting the discussion, would you please briefly introduce your professional backgrounds?

Buckwalter: I am an orthopedic surgeon. Although I have done hand surgery and trauma surgery, nowadays I mostly perform tumor surgery in patients with sarcomas of the soft tissues and bone and metastatic cancer. My research is primarily

focused on cell-matrix interactions, which seem very important in disease states such as degeneration of the intervertebral disc and OA. I have also looked at posttraumatic OA and investigated how to find better treatments for chondrosarcomas.

Lohmander: Although I am an orthopedic surgeon by training, I share my time between clinical work, surgery, and building up the research that I have been doing on cartilage and OA over the past 25 years.

Kawaguchi: I think that there might be some differences between the research environments in the USA, Europe, and Japan. In Japan, both clinical and basic research is performed by orthopedic surgeons who are MDs rather than by postdoctoral researchers with PhDs, since we do not have enough orthopedic research departments that are run by PhDs. Most of us do surgery, clinics for inpatients and outpatients, and research. Although public grants are available in Japan, basic research and clinical research are supported by two different ministries, which makes it tough for us to be able to conduct large-scale translational research. What is the situation regarding orthopedic research in the USA and Europe?

Buckwalter: In the USA, most of the very successful orthopedic research programs comprise multidisciplinary teams of orthopedic surgeons, bioengineers, and biologists, because

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research is very competitive in terms of funding.

Lohmander: That is also true in Europe. In Sweden at least, successful orthopedic research is done by multiprofessional teams wherein different professions focus on one disease or health problem and are able to provide different perspectives and thus can look at more than one dimension of the problem at once. In my team, we have physical therapists, orthopedic surgeons, biochemists, epidemiologists, and geneticists working together.

Buckwalter: Since it is difficult for any one person to master current biology, genetics, bioengineering, physical therapy, and epidemiology, working with experienced people in each of these fields allows us orthopedic surgeons to gain a different perspective by drawing on their various backgrounds, skills, and knowledge.

Lohmander: In particular, if you are a practicing orthopedic surgeon, reality says that you are only able to assign part of your time to doing research; you need to be supported and work together with people who have other areas of expertise. In the USA as well as Europe, the healthcare system is contracting and becoming more focused on effective delivery of healthcare. The key to future success is being able to bridge the gap between basic research and clinical work.

The World Health Organization Bone and Joint Decade 2000-10: successes and future directions for orthopedics research

Kawaguchi: Thank you. Now I would like to know your opinions on the World Health Organization (WHO) Bone and Joint Decade (BJD) initiative, which will come to its end next year in 2010. What do you think are the biggest advances that have been made in the clinical orthopedic field during this decade?

Lohmander: That is a very challenging question. I think that at least during the past 5 years there has been an increasing awareness within the orthopedics community that we need to do good, comparative, randomized clinical trials. For a long time, progress in orthopedics has been based largely on trial and error by individual orthopedic surgeons—much of it depending on experience rather than evidence. If we look critically at orthopedic practice, there are several areas that are not well supported by evidence. Take for instance arthroscopic surgery of the OA knee; there have been a number of papers published over the past few years showing that this modality is no better than sham surgery when compared in randomized clinical trials*. And there are other examples of orthopedic interventions that ought to be tried in the setting of controlled clinical studies. I think that a notably increased awareness and willingness to perform comparative randomized clinical trials is the most important recent development within the orthopedic community.

Kawaguchi: What do you think is the biggest advance in terms of surgical technique or drug or physical treatment?

Lohmander: In OA surgery, there has been continuous improvement and refinement in the technology of joint replacement. As for pharmacological treatment of OA, unfortunately



we are still lacking disease-modifying drugs, in contrast to the picture in rheumatoid arthritis, in which there has been significant progress with new biological treatments. Something of a similar nature for OA still seems a long way away at this time.

Buckwalter: The BJD was started in an effort to raise awareness of the impact of bone and joint disease on health and quality of life around the world. And I believe that it has been very successful in this aim. However, the question now is whether this raised awareness will be translated into increased research support and education. It is important for us to sustain our momentum past the end of the decade. We have to decide where do we go from here?

Kawaguchi: What do you think is the BJD's biggest advance technically?

Buckwalter: Awareness of orthopedic trauma care has risen dramatically. Before the decade started, I participated in some meetings at the WHO and was able to see that trauma care was really not very good in many parts of the world, but it has become much better. Also, besides trauma, treatment of clubfoot deformity has improved spectacularly in many regions, such as Africa, South America, Indonesia, and China; children with clubfoot who otherwise would have spent their lifetime being disabled and unable to work or even carry out normal daily activities are now going to live normal lives because of better education and the Ponseti technique, which has transformed treatment of this disorder.

The science journals in orthopedics, including the *Journal of Orthopaedic Research* and *Osteoarthritis and Cartilage*, have had an impact in the past 10 years in that they have encouraged orthopedic surgeons to become much more thoughtful and critical of accepted treatments rather than simply trusting the guidance of famous opinion leaders, as in the past.

Lohmander: Yes, that is an area in which journals can have a large impact and change attitudes as well as the practice of the profession by taking a lead and saying we are not going to accept papers that merely describe case series and draw extensive conclusions from those without being aware of the limitations of such studies. We want to publish well-controlled prospective cohort studies.

* Moseley JB, et al., *N Engl J Med*. 2002; 347: 81-88



Validity of basic science, and its application to clinical practice in orthopedics

Kawaguchi: Now I would like to ask about your views on the relation between basic research and clinical application in the orthopedic field in future. A lot of today's basic research seems very far from clinical application for the time being. It is being promoted as leading-edge research at the same time. What do you think of such very basic research?

Buckwalter: Indeed, there have been a lot of exciting basic scientific observations that are very fundamental and potentially important but a long way from being useful clinically. And sometimes enthusiasm for advances in basic science such as gene therapy, stem cells, artificial matrices, and such like has understandably made people want to take these into clinical practice before they have been thoroughly tested.

There is also the commercial element to this, when companies want to put products into the market and have them being used without doing prospective studies of their efficacy and safety, which could have some unfortunate consequences.

Lohmänder: On the other hand, although I mostly agree, we do also need to allow basic science to take its own spontaneous course without always asking what disease it is trying to cure. Because sometimes it is not until afterward that we can identify which very basic science results eventually led to a successful therapy. Basic science needs to be done in very widespread and bottom-up environments. The challenge for the clinical community is to be able to connect with basic science and help translate some of those ideas to clinical problems in orthopedics.

Editors' tips on how to get published in two leading international orthopedics journals

Kawaguchi: Let us talk about the *Journal of Orthopaedic Research* and *Osteoarthritis and Cartilage*. As we can see, these two journals are among the highest-impact factor titles in the field of orthopedics (Figure). Would you please give a brief overview, including each journal's aims and scope, target readers, contents, and recent hot topics?

Buckwalter: The *Journal of Orthopaedic Research* is a little over 25 years old. It was started by the Orthopaedic Research Society (ORS) because members of the society felt that there existed no high-quality journal for orthopedic science at that time. The

journal was launched to cover the entire breadth of orthopedic research from biomechanics to cell biology and genetics; papers were published on all tissues in the musculoskeletal system: muscle, blood vessels, peripheral nerves, spinal cord, bone, tendon, ligament, and intervertebral disc.

The journal only publishes original articles. One of our problems has been having enough pages to publish all the high-quality articles that we receive in timely fashion, so we do not publish reviews. The ORS still owns the journal, which explains its direction and future; the society wants to continue its emphasis on the entire breadth of orthopedic research and to publish original articles.

A little less than one-third of submissions come from the USA; the remainder are mostly from Japan, China, and Germany (about 7% each), followed by the UK, Austria, Switzerland, South Korea, Australia, and New Zealand (3-5%) and then a number of other countries that provide < 1% of submissions.

The direction in which the journal is going seems more toward electronic publication possibly within the next 5 years, with relatively few print copies distributed for libraries.

As for hot topics, the bulk of submissions are on bone healing, bone substitutes, growth factors, cell therapies for bone defects, and tissue engineering for bone. Papers on cartilage are second in terms of number of submissions. We see upswings in certain topics, then they go down again; for example, recently interest in tissue engineering has been growing very rapidly, whereas there has been a steady decline in papers on classic biochemistry and morphometry.

Lohmänder: *Osteoarthritis and Cartilage*, like the *Journal of Orthopaedic Research*, is a society-owned journal (owned by OARSI). *Osteoarthritis and Cartilage* was founded close to 20 years ago. As the title indicates, the journal focuses on OA and cartilage and aspires to cover all aspects of OA as a disease from the very basic aspects and genetics through disease mechanisms, molecular mechanisms, biomarkers, patient-relevant outcomes, clinical trials, epidemiology, and so on. *Osteoarthritis and Cartilage* publishes work submitted not only by orthopedic surgeons but also physical therapists and basic scientists working in



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any area related to OA and cartilage.

Currently, we are seeing an increasing rate of submissions related to imaging of joints, cartilage, and other tissues of the joints by magnetic resonance imaging and other imaging modalities. Also, there have been many submissions from people working in the tissue engineering field.

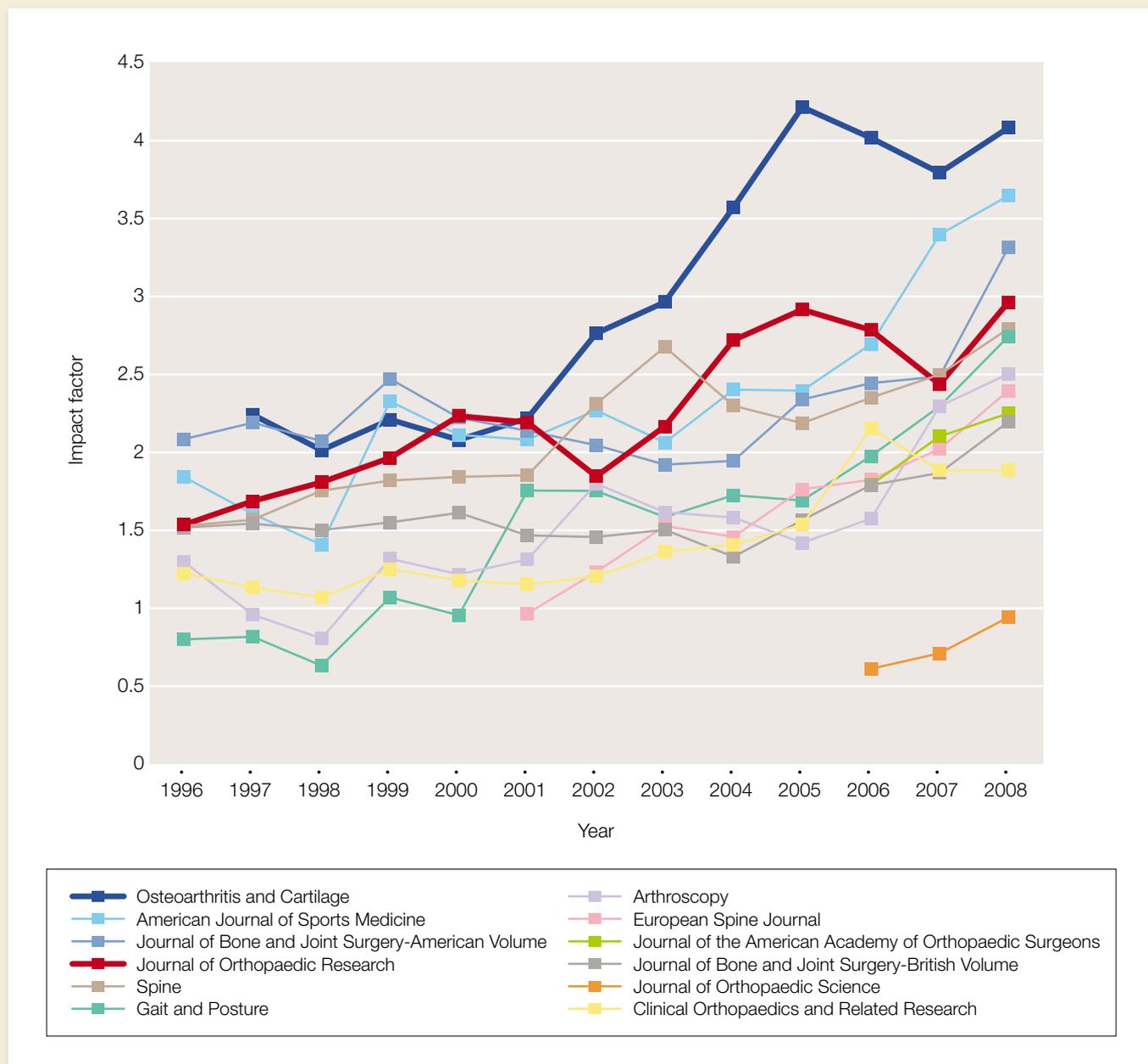
We have seen a continuous increase in the number of manuscripts submitted to the journal. With our page budget, we are able to publish approximately 200 manuscripts annually in *Osteoarthritis and Cartilage*. Therefore, unfortunately, we are

forced to reject increasing numbers of papers: approximately 70% have to be rejected.

About 50% of submissions come from the USA and Canada; 30% are from Europe and the remainder mainly from Asia. Japan currently submits approximately 8-10% of papers that are published in the journal.

Japan has a somewhat higher rejection rate than the average for the journal, at about 85%. Although the reasons for this are difficult to isolate, language is not really a problem any more with reports submitted from Japan—compared with say 20 years

Figure. Comparison of major international orthopedics journals by impact factor (IF), 1996-2008.



(From Journal Citation Reports, Thomson Reuters)

ago. Nowadays, the English in papers submitted from Japan is generally quite good.

Buckwalter: The overall acceptance rate at the *Journal of Orthopaedic Research* is around 30-35%. In many papers that we receive from abroad, we have less a problem with language but rather with the manuscript's organization. Sometimes, it is not clear how the reader should go from the introduction to the methods and understand the questions that were asked and the hypothesis. Our biggest problem is getting reviewers who are willing to spend time thoroughly to analyze and review an article, especially since they have many other obligations to their own research and their institution. Reviewers do not receive any compensation for reviewing articles, therefore clear, concise manuscripts stand a much better chance of being accepted than those that are too long and do not clarify why the work they describe is important and what questions or hypotheses the researchers were formulating. If I cannot understand these themes straight away, I will be unlikely to send a manuscript out for review because I do not wish to irritate reviewers.

Kawaguchi: It is good advice that when we write a manuscript, we should consider the standpoint of the reviewer.

Lohmander: The abstract is the key element of a paper. If the abstract does not clearly describe why and how the work was done and what are the conclusions, then the paper is in trouble. The abstract also needs to contain some hard data and methodological information. Authors should be aware that the abstract is often the only part of their paper that a reader will read.

Kawaguchi: There is an increasing trend for Japanese society journals to publish their content in English as well, to communicate research findings to scientists outside Japan. The *Journal of Orthopaedic Science*, official journal of the Japanese Orthopaedic Association, acquired an impact factor in 2006 and the number of citations is increasing steadily.

However, Japanese physicians also submit manuscripts to Western journals. Do you have any additional advice for young Japanese researchers on how to make their papers more acceptable?

Buckwalter: Most important is to have a clearly stated hypothesis or experimental question and to provide information that gives an answer to that question or tests that hypothesis. When planning a project, it is essential that the work be well conceived from the start and to define a question or hypothesis rather than merely presenting a tremendous amount of data and informa-

tion that is difficult to understand.

Lohmander: That is very important. Sometimes in papers there is a hypothesis or problem presented, but then at the end the authors do not answer their own question. And sometimes there is an answer at the end but there is no problem presented. Therefore authors should make sure at the end, when they have written their conclusions, to go back and check whether the paper ends by answering the question that was posed in the beginning. A well-organized paper with clearly presented results and discussion makes it easier for the editor, the reviewer, and the reader to understand and see why the work is important. And this should be concise and brief.

Message to readers

Kawaguchi: Finally, could you please give a message to young Japanese orthopedic surgeons, besides work hard!

Lohmander: I have visited Japan many times over the years and interacted with the Japanese orthopedic community, and have seen

some extremely positive developments in Japanese orthopedic research over the long term. The science in Japan is on par with that being done anywhere else in the world. So, I think that Japanese orthopedic surgeons should continue what they are doing but also consider placing more emphasis on connecting basic research with clinical practice.

Buckwalter: I would pass it on to others that one of the most satisfying and enjoyable aspects of

being an orthopedic surgeon is having the opportunity to do research, ask questions, and explore new ideas. I think that I would have gotten very bored very early in my career if I did not have that opportunity. So I urge people to ask questions and devise ways to answer those questions. Journals play a very important role in this process; they may change, they may no longer be in print, they may be published electronically, but because of the peer review process they allow work to be read and criticized, often rejected, but ultimately promote science and thinking and thereby make our profession better and stronger.

Kawaguchi: Dr Lohmander, Dr Buckwalter, thank you very much for your invaluable insights. It is hoped that today's proceedings will be of great use to young Japanese orthopedic surgeons who are doing research and want to express their findings all over the world through publication in international journals.

