

# Orthopaedic Healthcare Worldwide

## Collaborative Partnerships and the Future of Global Orthopaedics

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*Although North American surgeons have increasingly demonstrated a willingness to share their time, expertise, and knowledge with healthcare providers from resource-poor countries through surgical and educational missions, we also have much to learn from our colleagues in the developing world regarding strategies and tactics for preventing and treating musculoskeletal disease with limited resources. This type of knowledge transfer will become increasingly important as our own healthcare system is challenged to do more with less. In this article, Morshed et al. describe the current state of interaction between surgeons across the globe, and provide a roadmap for future collaboration that will enhance all of our*

*abilities to improve the value of care we provide for our patients.*

— Kevin J. Bozic MD, MBA

The body of evidence illustrating the impact of injury and musculoskeletal disease on global health continues to grow. The 2010 Global Burden of Disease study [11] estimated that injury accounted for 11% of disability-adjusted life years globally, with the majority occurring in low- and middle-income countries as a result of road-traffic

injuries. There are an estimated 1.2 million deaths and an additional 20 to 50 million nonfatal injuries from road-traffic injuries [14]. Appropriately, the WHO declared 2011 to 2020 a Decade of Action for road traffic safety [8]. This public health effort to promote injury prevention is likely to have an enormous long-term impact. However, while awaiting effective policy and infrastructure changes, orthopaedic surgeons in low- and middle-income countries are managing an overwhelming volume of musculoskeletal injuries with limited resources.

The broad disparity in resources includes inadequate or nonexistent emergency medical systems, workforce deficiencies, and a dearth of material resources [10]. Further, large gaps exist for education and research. Inadequate trauma care leads to profound human suffering unrecognized by the general public. However, among surgeons, the need for improved musculoskeletal care in developing countries is not novel. There is a rich history of humanitarianism within the specialty. Early efforts focused primarily on volunteerism through surgical missions providing direct patient care and surgery. Organizations such as the Orthopaedics Overseas in

Note from the Editor-in-Chief:

*We are pleased to present to readers of Clinical Orthopaedics and Related Research® the latest Orthopaedic Healthcare Worldwide column. This section explores the political, social, and economic issues associated with delivering musculoskeletal care in the many environments in which our specialty is practiced, both in the United States and around the world. We welcome reader feedback on all of our columns and articles; please send your comments to eic@clinOrthop.org.*

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Note from the Column Editor:

*The practice of medicine is no longer constrained by geographical borders. Innovative technologies have dramatically improved our ability to share ideas and learn from colleagues from around the world.*

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the United States, World Orthopaedic Concern in the United Kingdom, and others have established numerous sites to facilitate clinical care and educational activities through volunteerism [4]. Professional societies, such as the Société Internationale de Chirurgie Orthopédique et de Traumatologie (Society for Orthopaedic Surgery and Traumatology; SICOT) support conferences to share research, education, and networking opportunities [9]. SIGN Fracture Care International, a nongovernmental organization, uniquely addresses the lack of orthopaedic implants by manufacturing and donating intramedullary nails designed for low-resource environments and training local surgeons in their use [15].

Another avenue with immense potential to reduce disability and improve orthopaedic care is a collaborative partnership between resource-rich and resource-poor centers. While this is not a novel concept, particularly in nonorthopaedic specialties, we believe there is great potential for a comprehensive model of partnership that addresses clinical support, education, and clinical research [13]. This type of institutional partnership supports low- and middle-income countries' centers in a longitudinal and sustainable manner. Support for local or regional conferences, exchange of residents and faculty, and mentorship provide connections for additional

training through fellowships and observerships. The internet provides a powerful tool that allows for instant communication, information exchange, and educational opportunities [6]. An emphasis on exchange rather than a one-way flow of knowledge is crucial. By working with local leaders and educators at academic centers, there is a powerful multiplier effect as knowledge passes to future generations of surgeons through existing training programs.

Less emphasized, but equally important, is support for clinical research. Examples range from individual longitudinal mentorship for proposals and manuscripts to large-scale collaborative research studies. A qualitative investigation of orthopaedic surgeons in academic centers in sub-Saharan Africa highlighted an almost universal interest in participating in research studies [3]. Surgeons cited academic advancement and research requirements for trainees as incentives to participation in research, highlighting that academic models are actually quite similar. The dearth of resources and training in research methodology and inundation with clinical responsibility were cited as major impediments to progress. Despite scarce resources, we believe research represents a critical element in the development of academic institutions in low- and middle-income countries. Research addresses locally

relevant clinical questions, creates a culture of intellectual curiosity, and promotes critical quality improvement. Additionally, research may effectively advocate for greater resources from both local government and outside funders in order to affect crucial policy improvements.

As an example, we at the University of California San Francisco (UCSF) developed a partnership with the Muhimbili Orthopaedic Institute (MOI), an academic training center in Dar es Salaam, Tanzania. This collaborative partnership began with an exchange of faculty and trainees for clinical observerships and conferences. After surgeons from MOI participated in a research course held in San Francisco, we embarked on a collaborative effort to design a prospective study evaluating outcomes of operatively treated femur fractures. UCSF assisted in developing a robust research protocol, securing peer-reviewed funding, ethical approval, and providing inexpensive technologic aids such as small laptop computers and mobile phones for data collection, as well as access to a free web-based data collection system. The surgeons and staff at MOI completed the day-to-day study activities, which was aided greatly by very modest funding for two local research coordinators. In addition to biweekly, web-based conferencing, biannual site visits allowed UCSF investigators to mentor the MOI

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research team, as well as trainees from both institutions in the conduct of clinical research. To date, the study has enrolled over 300 patients and achieved greater than 75% followup at 6 months.

One cannot tout the successes of overseas involvement without also acknowledging that opportunity costs exist, such as the loss of revenue, burden to practice partners, absence from academic or administrative responsibilities, and time away from home. Nonetheless, many persevere in private practice and academia because the work is important; the question is: will it be valued by those in a position to support it? Its value to those who do the work is obvious (most everyone who has done this work confirms this). The support of one's partners and family is critical. In the academic context, political will among department leadership is crucial to the long-term success of collaboration. At the University of California, the political will on the part of department chairs and division chiefs has been vital to the development of an overseas elective for residents that is more than a decade old [5]. In 2006, the University of California established the Institute for Global Orthopaedics and Traumatology with the support of leadership, faculty, and residents. The institute's mission is to promote global orthopaedic academic partnership.

The financial challenges associated with the initiation of global academic collaboration are significant. However, the well-documented epidemic of trauma outlined above should serve as a foundation to begin advocating for support—from the governmental down to the departmental level. There is precedent for success on the part of our professional organizations rising to face such acute challenges. The American Academy of Orthopaedic Surgeons, Orthopaedic Trauma Association, and the Orthopaedic Research Society have advocated successfully for unprecedented funding of vital skeletal trauma research to treat conditions faced by our wounded warriors as a result of recent conflicts [12]. The time has come to focus our collective will to address the growing burden of orthopaedic conditions globally or miss the opportunity.

For those who see this spate of musculoskeletal afflictions as a foreign problem not worthy of our attention, we would ask them to reconsider. In our increasingly interconnected world, problems of this magnitude have global repercussions. In the United States, we are in the midst of a healthcare crisis caused by skyrocketing costs and indiscriminate obsession with unproven technologies and practices rather than value [1, 2]. While the outcome of the debate on this crisis remains uncertain, few would deny its critical

importance not only to the health of our nation, but to that of our economy, which itself affects the economies of many other nations. Orthopaedic surgeons must similarly acknowledge this predicament and open themselves to the possibility that the answers will come from many places, not just from the surgeons of one country. In time, most developed democratic nations and institutions have understood the folly of entrusting their welfare to a limited few of particular gender or ethnicity. Similarly, the possibilities of innovations that will transform orthopaedic care worldwide should not be limited by geographic boundaries. Any orthopaedic surgeon who had the opportunity to visit fellow surgeons practicing in developing nations and austere environments would attest to their remarkable creativity in addressing difficult problems with low-tech and affordable solutions. The SIGN intramedullary nail system, which was originally developed for use as an interlocking tibial nail in the absence of C-arm, was successfully adapted for use in the femur and humerus by innovative surgeons in developing countries out of necessity. There are now centers in the United States in financial constraint that may begin using the SIGN nail as a low-cost alternative to implants from more expensive manufacturers. This model could allow cost savings for U.S.

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hospitals, while simultaneously providing revenue for SIGN to continue donating implants in low-resource environments. By developing global networks and empowering leaders who may not otherwise benefit from the same resources that we have, we make a vital investment in the collective braintrust that will ultimately secure all of our futures.

Another reason the orthopaedic community should embrace global involvement with an emphasis on academic and clinical partnerships is the remarkable rise in teaching and service within our community. The aforementioned efforts of numerous organizations are a testament to the commitment that our colleagues are willing to make in order to serve. Those that have not yet left our borders to participate but pride themselves on education in regional or national teaching activities will be inspired by the enthusiasm of learners from underdeveloped nations. One of the most promising phenomena has been the increasing number of domestic orthopaedic training programs that have developed overseas electives [7]. These aspiring surgeons will fill our ranks with globally-minded leaders. Just as our professional organizations have recognized the importance of developing a cadre of basic and clinical researchers to ensure that orthopaedic surgery will not be left

behind, we must recognize the opportunity presented and secure career pathways and funding for those talented young surgeons looking to pursue global orthopaedics. Investing in career development awards through orthopaedic professional organizations, as well as governmental sources, will pay dividends.

We believe that orthopaedic surgeons should be proud of their embrace of volunteerism and educational activities both locally and globally. Individuals and institutions should increasingly partner with academic institutions in low-resource environments to foster the development of clinical, educational, and research activities. This evolution of outreach will confirm our commitment to mutually beneficial exchange programs and the development of self-sustaining systems for improving orthopedic healthcare around the world.

## References

1. Bozic KJ. Value-based healthcare and orthopaedic surgery. *Clin Orthop Relat Res.* 2012;470:1004–1005.
2. Bozic KJ. Improving value in healthcare. *Clin Orthop Relat Res.* 2013;471:368–370.
3. Caldwell A. Barriers to and Drivers of Orthopaedic Surgery Research in East Africa: A Qualitative Analysis of Interviews. Paper presented at: Bethune Round Table; May 2013. Vancouver, BC.
4. Derkash RS, Kelly N. The history of orthopaedics overseas. *Clin Orthop Relat Res.* 2002;396:30–35.
5. Disston AR, Martinez-Diaz GJ, Raju S, Rosales M, Berry WC, Coughlin RR. The international orthopaedic health elective at the University of California at San Francisco: the eight-year experience. *J Bone Joint Surg Am.* 2009;91:2999–3004.
6. Doughty K, Rothman L, Johnston L, Le K, Wu J, Howard A. Low-income countries' orthopaedic information needs: challenges and opportunities. *Clin Orthop Relat Res.* 2010;468:2598–2603.
7. Jense RJ, Howe CR, Bransford RJ, Wagner TA, Dunbar PJ. University of Washington orthopedic resident experience and interest in developing an international humanitarian rotation. *Am J Orthop (Belle Mead NJ).* 2009;38:E18–20.
8. Krug E. Decade of action for road safety 2011–2020. *Injury.* 2012;43:6–7.
9. Leong JC. Globalization in orthopedics. *J Orthop Sci.* 2004;9:537–539.
10. Mock C, Cherian MN. The global burden of musculoskeletal injuries: challenges and solutions. *Clin Orthop Relat Res.* 2008;466:2306–2316.
11. Murray CJ, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet.* 2012;380:2197–2223.
12. Pollak AN. Fulfilling our mission in research and education. [Published

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- online ahead of print December 14, 2012]. *J Orthop Trauma*.
13. Riviello R, Ozgediz D, Hsia RY, Azzie G, Newton M, Tarpley J. Role of collaborative academic partnerships in surgical training, education, and provision. *World J Surg*. 2010; 34:459–465.
  14. World Health Organization. Global status report on road safety: time for action. Available at: [http://whqlibdoc.who.int/publications/2009/9789241563840\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf). Accessed June 6, 2013.
  15. Zirkle LG Jr. Injuries in developing countries—how can we help? The role of orthopaedic surgeons. *Clin Orthop Relat Res*. 2008;466:2443–2450.