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Authors

Roberts, Heather J
Coss, Nathan
Urva, Mayur
et al.

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Host Perspectives of High-Income Country Orthopaedic Resident Rotations in Low and Middle-Income Countries

Heather J. Roberts, MD, Nathan Coss, BA, Mayur Urva, BS, Billy Haonga, MD, Pierre-Marie Woolley, MD, Bibek Banskota, MBBS, MRCS, MS, Saam Morshed, MD, PhD, David W. Shearer, MD, MPH, and Sanjeev Sabharwal, MD, MPH, FAOA

Investigation performed at the University of California San Francisco, San Francisco, California

Background: International orthopaedic resident rotations in low and middle-income countries (LMICs) are gaining popularity among high-income country (HIC) residency programs. While evidence demonstrates a benefit for the visiting residents, few studies have evaluated the impact of such rotations on the orthopaedic surgeons and trainees in LMICs. The purpose of this study was to further explore themes identified in a previous survey study regarding the local impact of visiting HIC resident rotations.

Methods: Using a semistructured interview guide, LMIC surgeons and trainees who had hosted HIC orthopaedic residents within the previous 10 years were interviewed until thematic saturation was reached.

Results: Twenty attending and resident orthopaedic surgeons from 8 LMICs were interviewed. Positive and negative effects of the visiting residents on clinical care, education, interpersonal relationships, and resource availability were identified. Seven recommendations for visiting resident rotations were highlighted, including a 1 to 2-month rotation length; visiting residents at the senior training level; site-specific prerotation orientation with an emphasis on resident attitudes, including the need for humility; creation of bidirectional opportunities; partnering with institutions with local training programs; and fostering mutually beneficial sustained relationships.

Conclusions: This study explores the perspectives of those who host visiting residents, a viewpoint that is underrepresented in the literature. Future research regarding HIC orthopaedic resident rotations in LMICs should include the perspectives of local surgeons and trainees to strive for mutually beneficial experiences to further strengthen and sustain such academic partnerships.

International rotations in low and middle-income countries (LMICs) are increasingly available for orthopaedic surgical residents. In 2015, >25% of orthopaedic residency programs in North America offered such rotations[1,2]. These programs benefit visiting residents by offering unique clinical experiences, developing an appreciation for responding to resource limitations, and fostering a long-lasting commitment to volunteerism[3,4].

Most studies on visiting resident rotations have been limited to the high-income country (HIC) perspective, and the impact of such rotations on surgeons and trainees in LMICs has not been well studied[5]. While potential benefits for LMIC hosts include academic exchange and addressing a gap in care, reported downsides include cross-cultural conflict, unintended interference with established systems, and care vacuums that are unintentionally created after rotations end[3,6-8].

Our group previously performed a survey study of North American orthopaedic surgeons and trainees who had participated in an LMIC rotation as a resident as well as orthopaedic surgeons and trainees from LMICs who had hosted a visiting resident from an HIC[9]. Positive and negative themes regarding the impact of visiting residents were identified (see Appendix A). In the current study, we aimed to qualitatively explore these themes through interviews to understand in greater detail the perceived benefits and drawbacks of visiting HIC residents, and to solicit recommendations for such rotations from LMIC surgeons and trainees.

Materials and Methods

Institutional review board approval for the study was obtained. A previous survey (see Appendix B) evaluating the impact of visiting orthopaedic residents as perceived by the

Disclosure: The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (http://links.lww.com/JBJS/H127).

LMIC hosting orthopaedic surgeons and trainees[9] and relevant peer-reviewed literature[5,10-13] were used to design a semi-structured interview guide (see Appendix C). A portion of the guide was focused on exploring the perceived impact of visiting residents, including the impact on patient care, orthopaedic education, and interpersonal experiences, and the remainder was focused on seeking recommendations for improving these rotations. The guide was refined with input from 6 orthopaedic surgeons and trainees from 3 countries (U.S., Haiti, and Tanzania) who had experience either as hosts or as part of an institution that sponsors trainees for international experiences.

The prior survey study identified hosting orthopaedic surgeons and trainees through their North American partners; all residency programs in the U.S. and Canada were contacted to participate, and those with a partnership with an institution in an LMIC were asked to distribute the survey to their LMIC partners[9]. For the present qualitative study, participants in the previous survey study who were willing to be contacted for follow-up questions were invited to participate. Snowball sampling was used to identify additional participants. Criteria for participation were orthopaedic surgeons or trainees in LMICs who had hosted visiting orthopaedic residents from HICs within the previous 10 years. Host orthopaedic surgeons who partner with the U.S. institution at which this study was conducted were included. The study was concluded when saturation was reached, which was defined as the point at which no additional themes were identified in subsequent interviews.

Interviews were conducted in person, via audioconferencing, or via videoconferencing by a single interviewer (H.J.R.). When appropriate, an interpreter who had advance access to the interview guide was used for interviews in the participant's preferred language. A bilingual member of the study team translated the interview guides, and back-translation was performed to ensure adequacy of translation. After written or verbal consent was obtained, interviews were recorded and subsequently transcribed. One interview conducted in Spanish was translated after transcription by a bilingual member of the study team. Interview length ranged from 30 to 90 minutes. Participants were not compensated for their time.

Transcript analysis was performed using ATLAS.ti software. Both deductive and open coding strategies were employed by 2 members of the study team (N.C. and M.U.). Deductive coding uses preestablished codes that are developed before researchers review the data and are based on prior literature in the area. In contrast, open coding is a process in which researchers identify distinct categories and ideas that emerge from the data[14-16]. A sample of 5 transcripts was reviewed to generate a codebook, and 3 additional interviews were coded using the codebook to ensure completeness, defined as the point at which no additional themes were identified. Each transcript was coded in duplicate, and discrepancies were resolved by consensus. Themes and subthemes were identified and reviewed by the research team. By asking open-ended questions, we explored differences in response based on geographic region, teaching hospital status, and rotation length. Representative quotes were identified.

Source of Funding
Funding from the Pediatric Orthopaedic Society of North America (POSNA) supported the study.

Results

Sixteen attending and 4 resident orthopaedic surgeons from LMICs who had previously worked with visiting orthopaedic residents from HICs were interviewed. Eight countries were represented (Ethiopia, Ghana, Haiti, India, Kenya, Nepal, Nicaragua, and Tanzania).

Rotation length varied from 1 week to 1 year, with many respondents reporting month-long rotations at their institution. The respondents represented a wide variety of hosting sites, including public hospitals (12), hospitals run by nongovernmental organizations (5), and private hospitals (3). Rotation structures also varied widely, including week-long volunteer trips that brought a full team from the HIC, long-standing institutional relationships with associated educational and research initiatives, and year-long fellowships at high-volume tertiary-care centers. Relationships between hosting sites and institutions sponsoring residents included long-standing partnerships, intermittent contact, and 1-time experiences. The following themes, except as otherwise noted, were consistent across hospital settings.

Perceived Impact of Visiting Residents

Thematic analysis identified themes and subthemes for the perceived impact of visiting residents, categorized into clinical care, education, interpersonal relationships, and resource availability. Representative quotes are included in appendices.

Clinical Care (Table I and Appendix D)

The positive impact of visiting residents on clinical care included acquiring new clinical skills and surgical techniques, which was reported by a majority of respondents. Another perceived positive impact was that patients appreciated receiving care from a "foreign" doctor. Most respondents thought that visiting residents did not generate complications by their involvement in patient care. For example, most respondents who worked in teaching hospitals that involved faculty oversight of training residents denied that visiting residents contributed to complications related to clinical

TABLE I Perceived Impact of Visiting Residents on Clinical Care in LMICs*

Theme	Subtheme
Positive impact	Acquiring new clinical skills
	Patient satisfaction with foreign doctors
Negative impact	Conflicting views on complications related to visiting resident involvement
	When visiting residents rotate at hospitals with support and continuity, lack of follow-up after they leave is not a concern

*For full table with representative quotes, see Appendix D.

care. No respondent reported problems with patient care and follow-up after the visiting resident left.

Education (Table II and Appendix E)

Three themes of positive impact on education were identified. First, visiting HIC residents learn about conditions that are rare in their home country and how to manage with limited resources. Second, a positive impact of learning from visiting residents was reported, particularly with respect to surgical skills, when they worked alongside the local surgeons in the operating room. Some respondents said that visiting residents motivate local residents and surgeons toward a higher standard, both in how they interact with patients and in how local faculty teach local and visiting residents. Multiple respondents also commented that visiting residents set an example with respect to study habits and focus on evidence-based medicine, reporting that local residents learn from this example. Third, respondents often commented that bidirectional exchange of knowledge and skills between visiting and local residents is empowering, relationship-building, and mutually beneficial.

Three negative effects of visiting residents on education were reported. First, some identified competition between visiting and local residents for educational opportunities, such as surgical cases and/or faculty attention. Second, some respondents reported experiencing this unhealthy competition in the presence of visiting HIC faculty, who favored educating visiting HIC residents and made the local residents feel excluded. Others reported this tension in the absence of visiting faculty, when local residents thought that local faculty spent more time with visiting residents than with local trainees. Other respondents believed that their high surgical volume created plenty of opportunity for all trainees and denied competition. Third, some commented that visiting residents did not demonstrate an interest in teaching local residents.

Interpersonal Relationships (Table III and Appendix F)

Almost all respondents commented on the importance of relationships in the success of visiting resident rotations. While most respondents reported positive relationships with visiting residents, 4 themes arose regarding negative interpersonal experiences. First, while all respondents denied racism from visiting residents, some reported insensitive generalizations about local culture. Second, some respondents stated that visiting residents had a sense of superiority toward local residents and surgeons. Third, visiting residents who were unfamiliar with the LMIC setting can react poorly to the stress of a new environment. Finally, respondents in non-English-speaking settings reported conflict because of the language barrier.

Resource Availability (Table IV and Appendix G)

Respondents commented on the impact of visiting residents on locally available resources. Two positive themes were identified regarding impact on the local institution. First, the majority of respondents reported that visiting residents bring access to resources, including textbooks, electronic resources, journal access, and surgical implants, which were appreciated by respondents. Second, some respondents reported that visiting residents improve the reputation of the local institution and facilitate accreditation.

Two themes were identified with respect to the burden on local faculty and residents. First, most respondents commented on the time and resource requirement of hosting visiting residents, including ensuring adequate accommodations, facilitating residents' transition to a new environment, and mediating interactions as visiting residents work with a new team. Second, respondents reported that translation for visiting

TABLE II Perceived Impact of Visiting Residents on Orthopaedic Education in LMICs*

Theme	Subtheme
Positive impact	
Teaching visiting residents	Visiting residents learn about conditions that are rare in their home country
	Visiting residents learn how to manage with limited resources
Learning skills and attitudes from visiting residents	Visiting residents teach surgical skills
	Visiting residents motivate local residents and surgeons toward a higher standard, with respect to patient care and education
	Visiting residents set an example of how to learn, through review of the literature and evidence-based medicine
Educational exchange	Visiting residents have more knowledge to contribute, while local residents have more surgical skill to teach
Negative impact	In some places, visiting and local residents compete for surgical volume or education, while in other sites, this does not occur
	Visiting residents who are not interested in teaching miss an opportunity to benefit local residents
	Some host residents felt excluded from the team when visiting teams visited

*For full table with representative quotes, see Appendix E.

TABLE III Perceived Impact of Visiting Residents on Interpersonal Relationships in LMICs*

Theme	Subtheme
Positive impact	Fostering interpersonal relationships facilitates impact from visiting residents
Negative impact	Some visiting residents make insensitive generalizations about local culture
	Some feel that visiting residents come with a sense of superiority toward local residents and surgeons
	Visiting residents not comfortable in a new environment can react poorly, leading to conflict
	Language barriers can lead to conflict

*For full table with representative quotes, see Appendix F.

residents who do not speak the local language requires time that can slow down delivery of clinical care.

Recommendations for Visiting Resident Rotations

Thematic analysis was also used to identify recommendations for visiting resident rotations (Table V). Seven themes were identified.

Rotation Length

All respondents agreed that longer rotations allow visiting residents to develop stronger relationships, have a greater impact on patient care and education, and see patients for longitudinal follow-up, thereby allowing local surgeons and trainees to reap the benefits of the resource investment required to host visiting residents. Most respondents agreed that these rotations ideally should last 1 to 2 months.

Visiting Resident Training Level

Respondents agreed that visiting rotations should be designed for senior residents, both to maximize the teaching impact of the visiting residents and to allow visiting residents to better appreciate learning opportunities from the rotation.

Prerotation Orientation and Expectations

Respondents from various contexts agreed that appropriate orientation is necessary to facilitate the transition to the LMIC setting and to allow visiting residents to prepare to share knowledge relevant to local surgeon and trainee interests. To provide site-specific information, a resident and/or faculty member who has been to the LMIC hospital previously should participate in this orientation.

Sustasectioncined Relationships and Continuity

All respondents agreed that the success of visiting resident rotations relies on the relationships that are developed and fostered. Continuity for the visiting resident program is important and may come from outside the visiting residents, such as through an HIC champion who facilitates the rotation and maintains the individual and programmatic relationships. Conversely, respondents reported negative effects when relationships were not sustained, which may jeopardize resident rotations.

Bidirectional Opportunities

Many respondents believed that successful resident rotations require mutually beneficial partnerships. Some commented that, ideally, local residents should be able to rotate in HICs similar to visiting residents rotating in LMICs, although financial and legal challenges and administrative barriers were recognized. Respondents also reported that other types of support, such as educational courses, research partnerships, and material resources, can benefit LMIC partners, thereby generating a mutually beneficial partnership.

Resident Attitudes

Respondents thought that characteristics of visiting residents that left a positive impact were humilList1ity and lack of arrogance, openness to new cultures, and a desire to serve and share. The importance of a resident's attitude should be included in the prerotation orientation.

Partner with Local Training Programs

Most respondents agreed that visiting residents have the greatest potential for a positive impact when rotating at LMIC institutions that are affiliated with local training programs. This allows for peer-to-peer educational exchange and takes advantage of a hospital structure designed for trainees.

Discussion

This qualitative study of the impact of international HIC resident rotations on the LMIC host surgeons and trainees is the first, to our knowledge, in orthopaedic surgery. In the setting of increased demand and opportunity for orthopaedic residents to train in LMICs, it is imperative to ensure that such experiences are mutually beneficial to the visiting residents and their overseas partners.

TABLE IV Perceived Impact of Visiting Residents on Resource Availability in LMICs*

Theme	Subtheme
Positive impact	Visiting residents bring access to resources
	Visiting residents can improve the reputation of the local department and/or hospital
Negative impact	Providing support and accommodations requires time and resource investment from local hosts
	Where there is a language difference, translation slows down clinical work

*For a full table with representative quotes, see Appendix G.

TABLE V Recommendations for Visiting Orthopaedic Resident Rotations in LMICs

Recommendation	Description	Supporting Quotes
Rotation length	Rotations should be at least 1-2 months to maximize impact, develop relationships, reap the benefits of the resource investment of hosting residents, and allow residents to see patients for follow-up	"It's time-dependent: the longer a resident rotates, the more likely they'll have a positive impact on the workflow. You come for 2 months, by your last couple weeks you're super effective and very helpful. But if you come for 2 weeks or 3 weeks, the first week and a half you're just getting oriented to the system." "I believe that a resident should visit for at least a month . . . for them to build a stronger relationship, not only for this visit but maybe for subsequent visits . . . That will go a long way to build a stronger relationship as a whole."
Visiting resident training level	Senior orthopaedic residents may have the greatest impact and be best able to appreciate learning opportunities	"I guess I should preface the answer with that I want [visiting] residents to be at least a PGY [postgraduate year] 4 or above to . . . rotate with us. That's when I feel they have the greatest impact on the provision of patient care. Prior to that stage of training, it's more of a liability."
Prerotation orientation and expectations	Prerotation orientation is necessary to set expectations regarding the new culture and cultural sensitivity and to prepare with appropriate educational material. Ideally, visiting residents develop language familiarity prior to the rotation	"I think that a site that does not have at least someone at that hospital from the same culture as the visiting resident, they might not want to have that resident come, if it's their first cross-cultural medical experience. That could be a big set-up for problems. One way around that would be to have visiting faculty come with that resident, if that faculty member is used to working in a cross-cultural setting, so that they can serve as their cultural guide." "[My country] is beautiful, but what they're not prepared to see, which shocks them, is the poverty. What shocks them is the lack of hygiene in a lot of places, and the smells . . . Some are fascinated, some are intimidated. You have to guide them on that: 'be prepared, not just for the sights, or the sounds, but also the smells . . . And also, you may see extreme poverty.'"
Sustained relationships and continuity		"The ideal goal in my mind is that if you build a strong relationship with a resident, that resident becomes a trauma fellow or whatever . . . in this setting, and that person wants to come back . . . That's what's beneficial." "If you really look deeply, I think, even within the institution, there's always an individual. So someone has to take this on board, and it has to be . . . close to their heart . . . There has to be sort of a commitment towards this sustainable vision from both parts. And I think that still comes from individuals." "Build a system where you can have continuity. Not just having the teams come down for a week – it takes much more time, in my opinion, to develop this bond, this relationship where the exchange is that much easier."
	Negative impact in the absence of sustained relationships	"Sometimes when you interact with people and you become friends and all that, and then suddenly this distance and the interaction suddenly disappears, then you end up feeling that oh, I should not have had any expectations, or should I have had expectations? I've had some occasions where my own expectations were not met, for example, there was someone who came here, and we interacted, and some great cases they were involved in, and there was a lot of nice talk, and then went back. And this particular person I approached to discuss a case that I was not sure about. But then, no reply. That kind of thing doesn't feel good." "And so I feel with these short term rotations, what happens is when you . . . see a setup like this, and the work being done and the pathology sometimes perhaps it's a lot to take in and you get overwhelmed, but as soon as you get back home, it becomes unimportant, because other priorities overwhelm you . . . That's what I keep seeing over and over and over again, and that kind of relationship is not long lasting."

continued

TABLE V (*continued*)

Recommendation	Description	Supporting Quotes
Bidirectional exchange		
	Ideally, local residents should also have an opportunity to rotate at the partnering institution	"One thing that I really think is important is [to have] an exchange program . . . The residents from the developed [country] would come to the low income country and see how things are done. And then the reverse would be also true and that [our residents] will see what actually is done there as well. It's really demanding but I think that'd be really good."
	Other types of support, such as courses, research, education, and material resources, can benefit all members of the partnership	"We have [an educational] course which happens every year, and that course brings in [visiting] faculty who teach soft tissue management and trauma management. We also have ongoing different studies, research projects which are ongoing through the same collaboration . . . It's give and take." "If some of these collaborations come with . . . hospital equipment, implants, and instruments, whether they are used or new, that would be helpful in the management of such patients, we gladly accept them." "What could be beneficial, especially for the hosting institution, which is a teaching institution, is to have access to your electronic library. If that could be given, so these guys here could access journals, electronic books from your library, that would be very helpful."
Resident attitudes		
	Humility and lack of arrogance	"Humility. And just being willing to learn from others, and not have to correct others . . . And a willingness to teach, but not with this mindset that they have everything right and their peers have it wrong. If there's one thing that's going to make or break it, it's their attitude when it comes to that."
	Openness to new cultures	"If there are a lot of cultural and social inhibitions regarding the food environment and everything, then they themselves don't want to interact with you or the patients because they have a lot of hang-ups. So then they become, like passengers in a train when nobody's going to involve them, because they are not able to adapt to the local circumstance."
	Desire to serve and share	"First of all, I would like to invite people who have the approach or the desire to serve in less privileged areas. I would like that as a prerequisite for selecting somebody, someone who has a motivation at some point of time in their career, to share their skills and their ability and the time and the money to help those who are less fortunate."
Partner with local training programs	Rotating with local trainees provides opportunity for more impact when teaching local residents, and may be safer to host residents in a hospital system accustomed to working with trainees	"A hospital without residents, [visiting residents] would have direct impact on the patients, but it will be short term, it will just be there for the time that they're here. For the [local] residents, because knowledge is transferred, then the skill will live in the community." "I'm biased, of course, but I really think at a hospital with trainees. In my opinion [it's] a learning environment that's positive for the trainee but also safe for the patients, because we have a system of checks and balances already set up that's designed to handle someone that's in the process of learning."

Multiple prior studies in other medical specialties have described the benefits of such rotations from the perspective of the visiting residents[17-24]. While studies examining the perspective of the host are sparse, 1 study involving emergency medicine (EM) physicians and trainees similarly highlighted the benefits of educational exchange[13] in international resident rotations. A study describing the HIC and LMIC perspectives on the impact of global health initiatives, which was not limited to visiting residents, suggested that longitudinal relationships can improve the delivery of care and attitudes toward medicine, such as personal initiative, a willingness to acknowledge mistakes, and patient advocacy[12]. Multiple studies have supported the importance of sustained relationships to the success of international global health experiences[12,13,21,25].

Despite overall positive reflections on international orthopaedic resident rotations that were reported by the local LMIC hosts, the perceived drawbacks have also been supported in prior studies. A qualitative study of international EM resident rotations similarly found that local doctors asked for comparable rotations in HICs for their residents and reported

that some local doctors felt frustrated by a lack of sustained relationships with visiting residents[13]. These factors were considered in a study that developed an ethical framework for global orthopaedic surgery, highlighting the need for bidirectional partnerships with shared decision-making models of care[26]. While previous studies have noted issues with continuity of care and patient follow-up[7,8], our study did not identify such problems associated with visiting resident rotations. In identifying the negative aspects of visiting resident rotations as reported by the LMIC hosts, our qualitative study adds to the literature through evidence-based recommendations with potential solutions to these barriers.

The attitude toward visiting orthopaedic resident rotations among respondents in this study varied with the context surrounding the resident rotation. Overall, respondents who worked with visiting residents as part of a larger and committed relationship with an HIC institution felt more positive toward visiting residents. In contrast, respondents who worked with visiting residents intermittently and without a larger context, such as faculty involvement, research relationships, or educational initiatives, had more reservations about visiting resident rotations. While the turnover of residency makes it impractical for a visiting resident to be responsible for developing a sustained relationship, committed faculty at the HIC institution can help foster such connections at both individual and institutional levels. Additionally, visiting residents must see themselves as ambassadors of their institution and stewards in fostering the international partnership, as their active participation in bidirectional exchange during the rotation has a substantial impact on local surgeons and trainees. Involving the outgoing visiting resident in the selection process and prerotation orientation for the subsequent visiting resident may be 1 way to increase such continuity.

Previous studies have delineated guidelines and recommendations regarding international global health training experiences in fields other than orthopaedic surgery[25,27-31]. The Working Group on Ethics Guidelines for Global Health Training (WEIGHT) guidelines were developed in 2010 on the basis of an expert working group and include recommendations for institutions, trainees, and sponsors[29]. The recommendations in our study are consistent with the WEIGHT guidelines, including setting clear expectations; selecting trainees who are adaptable, motivated, and culturally sensitive; promoting long-term relationships; and encouraging reciprocity. Unique recommendations supported by our study include sufficient rotation length, senior resident training level, and partnering with LMIC institutions that have local trainees. However, the specific needs of hosting institutions and visiting residents are likely to vary across locations and contexts, requiring flexibility in the interpretation of these recommendations in order to respond to these needs.

The limitations of our study include a small sample size that may not be representative of all LMIC orthopaedic surgeons and trainees who host visiting residents. While we sought responses from both LMIC host faculty and trainees, detailed information on host and sponsoring institutions and visiting resident demographics was not available for subgroup analysis. Eight of the 20 study respondents currently or previously engaged with our institution at some level, introducing potential selection bias. These respondents may have felt uncomfortable sharing negative aspects of resident rotations for fear of harming the broader partnership. Additionally, 19 of the 20 interviews were conducted in English, and it is possible that the experience of surgeons and trainees who do not comfortably speak English differs from those who do when hosting predominantly English-speaking visiting residents. While the interview guide was informed by prior literature, not all aspects of visiting resident rotations and their impact were explored in this study, leaving gaps in recommendations and room for future directions. Specifically, 2 aspects of visiting resident rotations that were mentioned but not developed in this study, and remain unresolved, are the role of e-learning platforms as an alternative to in-person experiences, and the advantages and disadvantages of visiting faculty accompanying visiting residents.

In conclusion, this study is the first, to our knowledge, to focus on the experience of LMIC surgeons and trainees when hosting visiting orthopaedic surgery residents. The perspective of LMIC stakeholders is crucial to include in the establishment and evaluation of international orthopaedic resident rotations. The recommendations outlined here are a starting point for developing a mutually beneficial and ethically grounded framework for international orthopaedic resident rotations.

Appendix

eA Supporting material provided by the authors is posted with the online version of this article as a data supplement at jbjs.org (http://links.lww.com/JBJS/H128). ■

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Heather J. Roberts, MD[1]
Nathan Coss, BA[1]
Mayur Urva, BS[1]
Billy Haonga, MD[2]
Pierre-Marie Woolley, MD[3]
Bibek Banskota, MBBS, MRCS, MS[4]
Saam Morshed, MD, PhD[1]
David W. Shearer, MD, MPH[1]
Sanjeev Sabharwal, MD, MPH, FAOA[1]

[1]Institute for Global Orthopaedics and Traumatology, Department of Orthopaedic Surgery, University of California San Francisco, San Francisco, California

[2]Department of Orthopaedics, Muhimbili Orthopaedic Institute, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania

[3]Department of Orthopaedics, HUP La Paix State University Hospital, Port-au-Prince, Haiti

[4]Department of Orthopedic Surgery, Hospital and Rehabilitation Center for Disabled Children, Banepa, Kavre, Nepal

Email for corresponding author: sanjeev.sabharwal@ucsf.edu

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