

ABJS/C.T. Brighton Workshop on Musculoskeletal Trauma in Developing Countries

Editorial Comment

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Injuries are a neglected epidemic in low- and middle-income countries (LMICs), accounting for 11% of the world's disease burden in 2001, and ranking 11th in all causes for both mortality and morbidity [9]. Road traffic crashes are predicted to be the eighth leading cause of death, and the fourth leading cause of DALYs (disability adjusted life years) by 2030 [10]. Each year, many of the 20 to 50 million injury survivors are left with a permanent disability, most often related to the musculoskeletal system. The economic and social costs of injuries are profound, and undoubtedly contribute to the vicious cycle of poverty in many developing nations. Despite the weight of evidence of this huge burden, research concerning the prevention and treatment of injuries in LMICs has been underfunded, and limited resources have been allocated for strengthening the delivery of medical services for the injured, including surgical care. Providing universal access to safe, timely, and effective services for musculoskeletal injuries will require a multidisciplinary, multisectoral effort aimed at strengthening the health care system. Key stakeholders include governments and their ministries of health, orthopaedic surgeons and other health care providers (surgical, medical and nonmedical), economists, public health specialists, and various organizations (nongovernmental organizations, professional societies, academic institutions).

The 2007 ABJS/Carl T. Brighton Workshop was dedicated to musculoskeletal trauma in low- and middle-income countries (LMICs) (Appendix 1). It was a privilege to share knowledge and experiences with individuals from more

than 20 countries, the majority of whom are orthopaedic surgeons practicing in a LMIC (Appendix 2). The goal of this workshop was to share knowledge on the burden of musculoskeletal injuries (and how they are addressed at the country level), to identify barriers to the delivery of services, and to offer solutions as to how musculoskeletal trauma care can be improved. The philosophy of this workshop departs from tradition; rather than approaching the subject from a patient-centered perspective, for example, how to apply specific treatment methods for selected musculoskeletal injuries in a resource-constrained environment, we chose to address “systems issues” surrounding the delivery of musculoskeletal trauma care at the population level in LMICs. Emphasis was placed on district level health facilities (or equivalent) where there is no orthopaedic surgeon. Table 1 lists some relevant information on the countries represented in the workshop.

The workshop commenced with two outstanding keynote addresses, in which two complementary initiatives from the World Health Organization were described. Both projects emphasized the provision of universal access to a core group of “essential” services, which are efficacious, cost-effective, and must be made available to all members of a society. The *Guidelines for Essential Trauma Care* provides health planners with a basic template from which “essential” trauma services may be organized at different levels of health facility, in terms of infrastructure, physical resources, and human resources [11]. Once the capacity to deliver these services is developed and maintained, their quality must be assured by imparting knowledge and skills to health care providers. The *Emergency and Essential Surgical Care Project* focuses on strengthening the delivery of essential surgical and anesthetic services at primary health facilities through the use of an integrated training package [1, 6, 14, 15]. These initiatives highlight the

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Table 1. Country Statistics. The world's population is currently estimated at 6,463,605, and the per capita gross national index is \$9420 (International \$). The International dollar is a hypothetical unit of currency that has the same purchasing power throughout the world

Country	World bank classification*	Population [19] (thousands) (2007)	Life expectancy [17] (2005, years) (M,F)	GNI per capita [5] (US \$, 2006)	Purchasing power parity [5] (Int \$, 2006)	Per capita health expenditure [13] (\$US, 2003)	Per capita government health expenditure [13] (\$US, 2003)	
United States	High	298,213	75	80	44,970	44,260	5711	2548
Canada	High	32,268	78	83	36,170	34,610	2669	1866
Oman	Upper/middle	2,567	71	77	9,070	14,570	278	231
Serbia	Upper/middle	9,863	70	75	3,910	NR	181	136
Brazil	Upper/middle	186,405	68	75	4,730	8,800	212	96
China	Lower/middle	1,323,345	71	74	2,010	7,740	61	22
Thailand	Lower/middle	64,233	67	73	2,990	9,140	76	47
Lesotho	Lower/middle	1,795	42	41	1,030	4,340	31	25
Sri Lanka	Lower/middle	20,743	68	75	1,300	5,010	31	14
Iraq	Lower/middle	28,807	NR	NR	1,224	NR	23	12
India	Low	1,103,371	62	64	820	3,800	27	7
Pakistan	Low	157,935	61	62	770	2,500	13	4
Nepal	Low	27,133	61	61	290	1,630	12	3
Mozambique	Low	19,792	46	45	340	1,220	12	7
Uganda	Low	28,816	48	51	300	1,490	18	5
Nigeria	Low	131,530	47	48	640	1,050	22	6
Malawi	Low	12,884	47	46	170	720	13	5
Ghana	Low	22,113	56	58	520	2,640	16	5
Zimbabwe	Low	13,010	43	42	340	1,950	40	14
Sierra Leone	Low	5,525	37	40	240	850	7	4
Cambodia	Low	14,071	51	57	480	2,920	33	6
Vietnam	Low	84,238	69	74	690	3,300	26	7

Country	Expenditure on health as % of GDP	Number of physicians [18]	Physicians per 1000 population [18]	Hospital beds per 10,000 People [18]	Infant mortality rate (per 1000 live births) [17]	Births attended by skilled staff [17]	Births by C-section [17]	Age standardized mortality rate due to injury (per 100,000)
United States	15.4%	730,801 (2000)	2.56	33 (2003)	7	99% (2003)	23% (2000)	47
Canada	9.8%	66,583 (2003)	2.14	36 (2003)	5	100% (2003–4)	19% (1997–8)	34
Oman	3%	3871 (2004)	1.32	21 (2005)	10	98% (2005)	NR	41
Serbia	NR	NR	NR	59 (2005)	8	NR	NR	NR
Brazil	8.8%	198,153 (2000)	1.15	26 (2002)	28	97% (2003)	4% (2001)	81
China	4.7%	1,364,000 (2001)	1.06	22 (2003)	23	83% (2004)	NR	79
Thailand	3.5%	22,435 (2000)	0.37	22 (2000)	18	99% (2000)	NR	74
Lesotho	6.5%	89 (2003)	0.05	NR	102	55% (2004)	NR	88
Sri Lanka	4.3%	10,479 (2004)	0.55	30 (2001)	12	97% (2000)	NR	82
Iraq	5.3%	17,022 (2004)	0.66	13 (2005)	NR	72% (2000)	NR	141
India	5%	645,825 (2004)	0.60	7 (2002)	56	47% (2003)	4% (2003)	117
Pakistan	2.2%	116,298 (2004)	0.74	7 (2003)	80	31% (2004–5)	NR	99
Nepal	5.6%	5384 (2004)	0.21	2 (2001)	56	19% (2006)	1% (2001)	108
Mozambique	4%	514 (2004)	0.03	NR	100	48% (2003–4)	3% (1997)	66
Uganda	7.6%	2209 (2004)	0.08	7 (2004)	79	39% (2000–1)	3% (2000–1)	154
Nigeria	4.6%	34,923 (2003)	0.28	12 (2000)	101	35% (2003)	2% (2003)	132
Malawi	12.9%	266 (2004)	0.02	NR	78	56% (2004–5)	3% (2000)	105
Ghana	6.7%	3240 (2004)	0.15	9 (2005)	68	47% (2003)	4% (2003)	97
Zimbabwe	7.5%	2086 (2004)	0.16	NR	60	80% (1005–6)	7% (1999)	103
Sierra Leone	3.3%	162 (2004)	0.03	4 (2006)	165	42% (2000)	2% (1997)	250
Cambodia	6.7%	2047 (2000)	0.16	6 (2001)	98	44% (2005–6)	NR	72
Vietnam	5.5%	42,327	0.53	14 (2002)	16	85% (2002)	10% (2002)	72

*The World Bank Classification is based on the bank's operational lending categories, which are calculated each year using the World Bank Atlas Method. The most recent data are based on 2006 GNI per capita as follows: low income (< \$905 or less), lower middle income (\$906–\$3,595), upper middle income (\$3,596–\$11,115), and high income (> \$11,116) [5].

recognition that the treatment of injuries is a global public health priority, and demonstrate the World Health Organization's commitment to this aim. Estimates suggest that more than 200 million major surgical procedures are performed in the world each year, more than twice the number of annual births [16]. As patients from the poorest third of the world receive only 3.5% of these procedures, large disparities in access to basic surgical care exist between rich and poor countries, and there is an enormous unmet need for surgical services in the poorest nations [16]. While the global burden of the surgical diseases has yet to be quantified (or disaggregated from existing data sets), injuries represent a substantial portion of this burden [3]. Surgery has traditionally been viewed as costly, technologically demanding, and resource intensive, but recent evidence suggests that surgical services can play a cost effective role in population-based healthcare [2, 3, 4, 8].

The first series of papers concern country models for the delivery of musculoskeletal trauma care. The burden of trauma was emphasized, especially road traffic crashes, and common challenges were discussed. Deficiencies in the capacity to provide services include a lack of infrastructure, inadequate physical resources, insufficient numbers of healthcare providers, and a lack of organized systems for addressing the burden of trauma. Assuming that the capacity to deliver essential services can be provided, the quality of services depends upon the acquisition, maintenance, and enhancement of knowledge and skills within the health workforce.

Addressing the burden of musculoskeletal injuries at the country level begins by acknowledging that injuries are a major public health concern. While experiential evidence supports this contention, there is limited epidemiologic information on the burden of musculoskeletal injuries in LMICs. Epidemiologic data must be collected to quantify the burden, and to identify risk factors, at the local, regional, and national levels. This knowledge may not only guide preventive efforts, but also inform the allocation of resources for strengthening care for the injured. Governments and their ministries of health, as "stewards" of each health system, must be convinced to implement (and enforce) policies and legislation aimed at prevention, treatment, and rehabilitation following injuries. While providing a full complement of trauma care services is unrealistic at the population level in LMICs, a core group of services can and should be provided as "rights of the injured", as defined by the two initiatives from the World Health Organization. Prehospital care must also be addressed. Formal systems for stabilization and transport may be impractical because of geographic barriers (lack of roads or motorized transport) and/or economic constraints, but informal mechanisms must be developed utilizing members of the community, such as the "enlightened citizen" or others (taxi drivers, truck drivers, police).

Improvements in the capacity and quality of musculoskeletal trauma services, focusing on safe, low-risk, and low-cost interventions, can only be achieved through a multidisciplinary, multisectoral effort.

The next session focused on regional perspectives on training health workers, including orthopaedic surgeons. Recognizing the global crisis in the health workforce, especially in the rural areas in LMICs, only a small subset of patients with musculoskeletal injuries will ever be treated by an orthopaedic surgeon. In addition to a shortage in absolute numbers, the migration of health workers (brain drain) from rural to urban environments, and from economically underdeveloped to economically developed regions (and countries), has created large gaps in access to care. While the majority of people in LMICs reside in a rural setting, most health workers are found in urban areas. Strategies must be developed to staff the health facilities in rural or underserved areas, and to impart the appropriate knowledge and skills required to treat musculoskeletal injuries. Training programs must be geared to the local disease burden, and must focus on interventions which can realistically be provided with the resources available locally. Some countries have invested in training surgeons and surgical subspecialists, while others have embraced the concept that paraprofessionals may be adequately trained to care for selected surgical conditions, including musculoskeletal injuries. This approach has become popular in sub-Saharan Africa, and while the titles, skill set, and responsibilities of these health workers vary between countries, they often make a substantial contribution to the delivery of surgical services at district level health facilities. For example, the Orthopaedic Clinical Officers provide a large percentage of the musculoskeletal services in Malawi. Another approach involves the training of "rural" surgeons, recognizing that the "western" model of surgical education, including the training of subspecialists, does not suit the needs of rural communities in LMICs. Rural surgery has been defined as "need based multidisciplinary surgery under resource constraints to make surgical care affordable and accessible to the community" [7]. Dr. K.M. Shyamprasad has been a strong advocate for this nontraditional model of training, to address large gaps in access to surgical care in the rural areas of India. He provided the group with an excellent overview of the rationale, scope of practice (including the musculoskeletal component), and current status of the rural surgeons program in India. After completing medical school, candidates enter a three year training program focusing on a core group of procedures, emphasizing the treatment of emergencies, drawn from all of the surgical subspecialties including obstetrics/gynecology. They are then certified, and expected, to practice in a rural environment. There is now an International Federation of Rural Surgeons, and the

majority of members practice in sub-Saharan Africa and India. The role of nongovernmental organizations and international orthopaedic societies in improving musculoskeletal trauma care was also explored. While some organizations provide service in the field, the importance of training cannot be overemphasized, and the greatest impact comes through sustainable educational programs. For example, Health Volunteers Overseas has promoted a model in which short term volunteers provide ongoing education in a variety of specialties, including orthopaedic surgery. Short-term educational courses in trauma care may also be beneficial, as illustrated in Ghana and Lesotho. Training traditional bonesetters may also be productive, as a short course in fracture care was shown to decrease the incidence of complications such as infection and gangrene [12]. These practitioners care for a large number of patients with musculoskeletal injuries in LMICs, and working with them, rather than against them, can only benefit the health care system.

Even if adequate staffing with health workers can be achieved, mechanisms to maintain and enhance their education must be developed. While continuing medical education may be provided through courses, workshops, and professional interactions, health workers also need immediate access to relevant and reliable information, appropriate to the problems they treat, using the resources available to them. The internet provides access to a voluminous amount of information, but is this a practical resource for the busy health worker in a LMIC? Many international journals present high quality scientific publications, but the content may not reflect the disease burden in LMICs, and the methods of treatment may not be applicable at the district hospital level in LMICs. While local or regional journals from LMICs may contain more relevant information, most are not indexed in Medline or other databases. Initiatives such as the Ptolemy project may help bridge the gap, providing individuals and institutions with access to not only journals, but also a variety of other educational resources. In addition, there is an urgent need for research studies concerning the many facets of musculoskeletal trauma in LMICs. Relevant topics include the epidemiology/prevention, development of appropriate and sustainable treatment (and training) strategies for the resource-constrained environment, and mechanisms to address the burden at the level of the health system.

In addition to formal presentations, the workshop included a number of breakout sessions, in which small groups were charged with discussing an issue and presenting their recommendations to the general session. Topics included the delivery of prehospital and hospital-based musculoskeletal trauma care, teaching and training of orthopaedists and nonorthopaedists, and methods to improve collaboration with other stakeholders to improve

musculoskeletal trauma care in LMICs. A synopsis of most of these sessions is included in this symposium.

In conclusion, musculoskeletal injuries are a substantial burden in LMICs; the problem is complex, multidimensional, and can only be solved through a multidisciplinary, multisectoral effort. The ABJS/CT Brighton workshop generated considerable enthusiasm among participants, and we all hope this will translate into collaboration in the future. While we recognize the importance of prevention, improving treatment is essential. Best practice guidelines will necessarily vary between (and within) countries, yet the overall goal must be to strengthen both capacity and quality at the level of the health system. This may be accomplished by providing adequate infrastructure, essential physical resources and supplies, training (and ongoing education) for both the orthopaedist and the nonorthopaedist, and access to appropriate medical information. The time has come for the global orthopaedic community, in association with other stakeholders, to address the many barriers to the delivery of safe, timely, and effective care for patients with musculoskeletal injuries in LMICs.

Acknowledgments Along with course co-chairmen Mark Vrahas and John Dormans, I wish to thank all the individuals who dedicated their time and energy to the workshop. It was a pleasure for us to make new friends, and to share knowledge and experiences with colleagues from around the world. Special thanks go to our local host Manjul Joshipura, a champion in the quest to strengthen trauma care systems globally. We thank Meena Cherian and Charles Mock for broadening our perspective on the delivery of musculoskeletal trauma care, and Richard Brand for his leadership, editorial assistance, and support throughout the entire process. Colette Hohimer worked tirelessly on organizing the workshop and maintaining communication with the course chairs, members of the steering committee, and all of the workshop participants. We recognize the efforts of the ABJS/CT Brighton Workshop Steering Committee (Manjul Joshipura, Marcos Musafir, Mahendra Patel, Wahid Al-Kharusi, John Dormans, Cyril Toma, Mark Vrahas, Bruce Browner, and Richard Brand). Special thanks go to the workshop participants (Appendix 1) for their excellent presentations, and their contributions to the breakout sessions. Finally, we would like to recognize our sponsors, the Association of Bone and Joint Surgeons, the Orthopaedic Research and Education Foundation, Synthes, and the Stryker Company.

Appendix 1. Workshop Participants

Local Hosts

Manjul Joshipura, MD, Ahmedabad, India
Mahendra R. Patel, MD, Elyria, OH

Workshop Chairs

John P. Dormans, MD, Philadelphia, PA
David A. Spiegel, MD, Philadelphia, PA
Mark S. Vrahas, MD, Boston, MA

Participants

Wahid Al-Kharusi, MD, FRACS, Sultanate of Oman
 Anil Arora, Prof., New Delhi, India
 S.M. Awais, MD, Lahore, Pakistan
 Sudhir S. Babhulkar, MD, Nagpur, India
 Marco Baldan, MD, Geneva, Switzerland
 Ashok K. Banskota, MD, Kathmandu, Nepal
 Richard A. Brand, MD, Philadelphia, PA
 Bruce D. Browner, MD, Farmington, CT
 Duong Bunn, MD, Phnom Penh, Cambodia
 Meena N. Cherian, MD, Geneva, Switzerland
 Richard Coughlin, MD, San Francisco, CA
 Marcos Britto da Silva, MD, Rio de Janeiro, Brazil
 Richard C. Fisher, MD, Denver, CO
 Richard Gosselin, MD, El Granada, CA
 Thamer Hamdan, FRCS, FACS, FICS, Basrah, Iraq
 Andrew Howard, MD, Toronto, Ontario, Canada

Zhen-Sheng Ma, MD, Xi'an, China
 Bachong Mahaisavariya, MD, Bangkok, Thailand
 Nyengo Mkandawire, MD, Blantyre, Malawi
 Charles Mock, MD, PhD, Geneva, Switzerland
 Marcos Musafir, MD, Rio de Janeiro, Brazil
 Ed Naddumba, MD, FCS (ECSA), Kampala, Uganda
 David Oloruntoba, MD, Mthatha, South Africa
 Ajibade Omololu, MD, Ibadan, Nigeria
 Robert Quansah, MD, Kumasi, Ghana
 K.M. Shyamprasad, MD, Delhi, India
 Girish Singh, MD, Dharan, Nepal
 Cyril Toma, MD, Kuala Lumpur, Malaysia
 Nguyen Anh Tuan, MD, Ho Chi Minh City, Vietnam
 George Vera, MD, Harare, Zimbabwe
 Zoran Vukasinovic, MD, Belgrade, Serbia
 James P. Waddell, MD, Toronto, Ontario, Canada
 Kaye Wilkins, MD, San Antonio, TX

Appendix 2



Association of Bone and Joint Surgeons
 Carl T. Brighton Workshop on Musculoskeletal
 Trauma in Low and Middle Income Countries

December 11-14, 2007
 Taj Residency Umed
 Ahmedabad, India

CLINICAL
 ORTHOPAEDICS
 AND RELATED RESEARCH

— Agenda —

Tuesday, December 11, 2007		
Gokuldwarka Room		12:00-5:00 PM
Session I: Moderator – David A. Spiegel, MD		
Introduction		
• History of the Brighton Workshop	<i>Richard A. Brand, MD</i>	12:00-12:07 PM
• Welcome by Local Host	<i>Manjul Joshipura, MD</i>	12:07-12:14 PM
• Genesis of This Year's Topic	<i>Mark J. Vrahas, MD</i>	12:14-12:21 PM
• Goals for the Workshop	<i>John P. Dormans, MD</i>	12:21-12:28 PM
Keynote Addresses		
• The Global Burden of Musculoskeletal Injury: Challenges and Solutions	<i>Charles Mock, MD, PhD</i>	12:30-1:00 PM
• Emergency and Essential Surgical Care	<i>Meena Cherian, MD</i>	1:05-1:35 PM
Discussion		1:40-2:00 PM
Coffee Break		2:00-2:30 PM
Session II: Country Models for the Delivery of Musculoskeletal Trauma Care: Challenges and Solutions (Systems Issues)		
<small>(Focus is on each country rather than the presenter's institution. Suggested outline for each talk: 1) country (distribution of population); 2) health care system (facilities/capacities, manpower, barriers to the delivery of care); 3) preventive strategies; 4) suggestions for strengthening the delivery of services.)</small>		
Moderators – Wahid Al-Kharusi, MD and Sudhir Babhulkar, MD		
• Musculoskeletal Trauma Services in Uganda	<i>Ed Naddumba, MD</i>	2:30-2:40 PM
• Musculoskeletal Trauma Services in Thailand	<i>Bachong Mahaivariya, MD</i>	2:40-2:50 PM
• Musculoskeletal Trauma Services in Zimbabwe	<i>George Vera, MD</i>	2:50-3:00 PM
Discussion		3:00-3:15 PM

Tuesday, December 11, 2007 (continued)

Session II (continued)			
Moderators – Nguyen Anh Tuan, MD			
• Musculoskeletal Trauma Services in Serbia	<i>Zoran Vukasinovic</i>		3:15-3:25 PM
• Musculoskeletal Trauma Services in China	<i>Zhen-Sheng Ma</i>		3:25-3:35 PM
• Deficiencies in Combating the Injury Burden in Nepal: Suggestions for Action at the Policy/ Practice Level	<i>Girish Singh, MD</i>		3:35-3:45 PM
Discussion			3:45-4:00 PM
Coffee Break			4:00-4:30 PM
Session II (continued)			
Moderators – Anil Arora, MD and Ed Naddumba, MD			
• Musculoskeletal Trauma Services in Serbia/Montenegro			4:30-4:40 PM
• Musculoskeletal Trauma Services in India	<i>Sudhir Babhulkar, MD</i>		4:40-4:50 PM
• Experiences in Mazambique and Sri Lanka	<i>Richard Fisher, MD</i>		4:50-5:00 PM
Discussion			5:00-5:10 PM
Reception and Dinner at Hotel – Poolside			7:00-10:00 PM

Wednesday, December 12, 2007

Breakfast – Matura Hall			6:30-7:30 AM
Transportation to Apollo Hospital			7:30 AM
Session III: Regional Perspectives on Training: Orthopaedic Surgeons and Non-orthopaedic Surgeons (Outline regional experiences: 1) training in trauma for orthopaedists; 2) training in trauma for non-orthopaedists; 3) certification/maintenance of certification, CME; 4) role of traditional practitioners (who are they, what percentage of the population do they serve, what are their techniques, results, how can we work with rather than against them.)			
Moderators – David Oloruntoba, MD and Ashok Banskota, MD			
• Traditional Medical Practices and Orthopaedics	<i>Duong Bunn, MD</i>		8:00-8:10 AM
• Training the Traditional Bonesetters: Experiences in Nigeria	<i>Bade Omolulu, MD</i>		8:11-8:21 AM
• The “Orthopaedic Clinical Officers” Program in Malawi	<i>Nyengo Mkandawire, MD</i>		8:22-8:32 AM
Discussion			8:33-8:48 AM
Moderators – Bachong Mahaivisariya, MD and Bruce Browner, MD			
• Musculoskeletal Training for Orthopaedists and Non-orthopaedists: Experiences in India	<i>Anil Arora, MD</i>		8:49-8:59 AM
• Musculoskeletal Training for Orthopaedists and Non-orthopaedists: Experiences in Pakistan	<i>Syed M. Awais, MD</i>		9:00-9:10 AM
• Musculoskeletal Training for Orthopaedists and Non-orthopaedists: Experiences in Ghana	<i>Robert Quansah, MD</i>		9:11-9:21 AM
Discussion			9:22-9:42 AM
Coffee Break			9:43-10:43 AM
Session III (continued)			
Moderators – George Vera, MD and Zoran Vukasinovic, MD			
• Musculoskeletal Training for Orthopaedists and Non-orthopaedists: Experiences in Brazil	<i>Marcos Britto Da Silva, MD</i>		10:45-10:55 AM
• Musculoskeletal Training for Orthopaedists and Non-orthopaedists: Experiences in China	<i>Zhen-Sheng Ma</i>		10:56-11:06 AM
• Musculoskeletal Training for Orthopaedists and Non-orthopaedists: Experiences in Nepal	<i>Ashok Banskota, MD</i>		11:07-11:17 AM
• Musculoskeletal Training for Orthopaedists and Non-orthopaedists: Experiences in Lesotho	<i>David Oloruntoba, MD</i>		11:08-11:18 AM
Discussion			11:19-11:34 AM
Lunch – Location TBD			11:45 AM-12:45 PM

Wednesday, December 12, 2007 (continued)

Session IV: Role for Non-Governmental Organizations and International Orthopaedic Societies in Promoting Musculoskeletal Trauma Care (Suggested outline: 1) description of each program; 2) regions of involvement; 3) what works, what doesn't work, and lessons learned; 4) interaction with government/ministry of health; 5) suggestions for collaboration between organizations.)		
Moderators – Robert Quansah, MD		
• The WHO Essential Trauma Care Project: A Template to Provide Universal Services for the Injured	<i>Manjul Joshipura, MD; Charles Mock</i>	1:00-1:10 PM
• Orthopaedics Overseas	<i>Richard Coughlin, MD</i>	1:11-1:21 PM
• SICOT	<i>Cyril Toma, MD</i>	1:22-1:32 PM
Discussion		1:33-1:48 PM
Moderators – Manyi Wang, MD and Marcos Britto da Silva, MD		
• Association for the Rational Treatment of Fractures	<i>James Waddell, MD</i>	1:49-1:59 PM
• Childrens disability in Nepal=Call to Strengthen Services at Primary Health facilities	<i>David A. Spiegel, MD; Ashok Banskota, MD</i>	2:00-2:10 PM
Discussion		2:11-2:21 PM
Coffee Break		2:38-3:08 PM
Session V: Update on Road Traffic Crashes		
Moderators – James Waddell, MD		
• Evidenced Based Review of Interventions for Road Traffic Crash Prevention	<i>Bruce Browner, MD</i>	3:10-3:30 PM
• Progress in South America	<i>Marcos Musafir, MD</i>	3:31-3:51 PM
• Progress in the Middle East	<i>Wahid Al-Kharusi, MD</i>	3:52-4:12 PM
Discussion		4:12-4:27 PM
Transportation Returns to Taj Hotel		4:30 PM
Group Dinner in Ahmedabad – Transportation Departs Hotel 6:00 PM	Dinner	6:30-9:30 PM

Thursday, December 13, 2007

Breakfast – Matura Hall		7:00-7:45 AM
Session VI: “Essential” Musculoskeletal Trauma Care (Goals: 1) discuss avenues for information transfer; 2) define core orthopaedic skills which are safe, efficacious, cost-effective, and are universally available; 3) define which fractures/injuries need surgery in settings with limited resources, outline appropriate treatment.)		
Information Transfer		
Moderators –Thamer Hamdan, MD		
• The Internet, HINARI, and the Ptolemy Project	<i>Andrew Howard, MD</i>	8:00-8:10 AM
• “OrthoChina.com”: Case Based Interactive Format for Improving the Quality of Care	<i>Ma Zhen-Sheng, MD</i>	8:11-8:21 AM
• Outreach Courses	<i>Kaye Wilkins, MD</i>	8:22-8:32 AM
Discussion		8:33-8:48 AM
Indications and Appropriate Techniques for Surgery in Extremity Fractures		
Moderators – Duong Bunn, MD and Rick Coughlin, MD		
• Soft Tissue Coverage at the Resource Challenged Facility	<i>Nguyen Anh Tuan, MD</i>	8:49-8:59 AM
• Update on the “SIGN” Project	<i>Lewis Zirkle, MD</i>	9:00-9:10 AM
• Treatment of Open Fractures: Application of the Ganga Classification in the Rural Setting	<i>S. Rajasekaran, MD</i>	9:11-9:21 AM
Discussion		9:22-9:37 AM
Coffee Break		9:38-10:08 AM
Session VII: War Surgery/Disaster Relief		
Moderators – Dick Fisher, MD AND S.M. Awais, MD		
• The ICRC Experience	<i>Marco Baldan, MD</i>	10:10-10:30 AM
• Experiences from Sierra Leone	<i>Richard Gosselin, MD</i>	10:31-10:51 AM
• Experiences from Iraq	<i>Thamer Hamdan, MD</i>	10:52-11:12 AM
Discussion		11:12-11:27 AM
Lunch – Poolside		11:30 AM-12:30 PM
Special Lecture		
• The “Rural Surgeon” of India: Concept, Scope of Practice, and Certification	<i>K.M. Shyamprasad, MD</i>	12:40-1:10 PM
Discussion		1:11-1:26 PM
Coffee Break		1:27-1:42 PM

Thursday, December 13, 2007 (continued)

Breakout Sessions	
Breakout Session I: Essential Surgical Skills for the District Hospital or Equivalent	
Please use the following schedule:	
• 45-minute breakout session to discuss your topic	1:45-2:30 PM
• 30 minutes for facilitator and rapporteur to compile summary statement	2:30-3:00 PM
• 15 minutes (5 minute presentation and 10 minute discussion) for each rapporteur to report back to general assembly	3:00-3:45 PM
Group A:	“Essential Surgery” for Upper Extremity Fractures – Gokuldwarka Room
<i>Facilitator:</i>	
<i>Rapporteur:</i>	Kaye Wilkins
<i>Participants:</i>	Arora, Toma, Banskota, Gosselin, Howard, Vukasinovic, Vera, Mkandawire, Al-Kharusi, Zhen-Sheng, Babhulkar
Group B:	“Essential Surgery” for Lower Extremity Fractures – Narmada Hall
<i>Facilitator:</i>	Mark Vrahas
<i>Rapporteur:</i>	Bruce Browner
<i>Participants:</i>	Britto da Silva, Dormans, Tuan, Coughlin, Hamdan, Baldan, Naddumba, Bunn
Group C:	Elements of a Successful Curriculum for “Essential” Surgical Care for Fractures – Mathura Hall
<i>Facilitator:</i>	Syed M. Awais
<i>Rapporteur:</i>	Richard Fisher
<i>Participants:</i>	Oloruntoba, Musafir, Mahaisavariya, Brand, Singh, Cherian, Mock, Omolulu, Quansah, Spiegel, Joshipura, Waddell, Shyamprasad
Group Dinner at Hotel – Poolside	
	6:00-9:00 PM

Friday, December 14, 2007

Breakfast – Poolside		7:00-7:45 AM
Opening Remarks		8:00-8:05 AM
Breakout Session II: Where Are we Going from Here?		
Please use the following schedule:		
• 45-minute breakout session to discuss your topic		8:05-8:50 AM
• 30 minutes for facilitator and rapporteur to compile summary statement		8:50-9:20 AM
• 15 minutes (5 minute presentation and 10 minute discussion) for each rapporteur to report back to general assembly		9:20-10:05 AM
Group A:	Systems for Prehospital Care – Gokuldwarka Room	
<i>Facilitator:</i>	Manjul Joshipura	
<i>Rapporteur:</i>	Ed Naddumba	
<i>Participants:</i>	Browner, Vrahas, Britto da Silva, Babhulkar, Wadell, Tuan, Hamdan, Quansah, Fisher, Awais, Mahaisavariya	
Group B:	Standardization of Resources for Musculoskeletal Trauma Care – Narmada Hall	
<i>Facilitator:</i>	Charles Mock	
<i>Rapporteur:</i>	Marcos Musafir	
<i>Participants:</i>	Dormans, Banskota, Bunn, Coughlin, Howard, Vukasinovic, Mkandawire, Oloruntoba, Zhen-Sheng, Toma	
Group C:	Working with Health Planners, Administrators, Government Officials, Others – Mathura Hall	
<i>Facilitator:</i>	Girish Singh	
<i>Rapporteur:</i>	Bade Omolulu	
<i>Participants:</i>	Brand, Spiegel, Al-Kharusi, Arora, Gosselin, Cherian, Wilkins, Baldan, Vera, Omolulu,	
Coffee Break		10:05-10:35 AM
Breakout Session III: Training and Certification		
Please use the following schedule:		
• 45-minute breakout session to discuss your topic		10:35-11:20 AM
• 30 minutes for facilitator and rapporteur to compile summary statement		11:20-11:50 AM
• 15 minutes (5 minute presentation and 10 minute discussion) for each rapporteur to report back to general assembly		11:50 AM-12:35 PM
Group A:	Access to Educational Materials – Gokuldwarka Room	
<i>Facilitator:</i>	Andrew Howard	
<i>Rapporteur:</i>	Ma Zhen-Sheng	
<i>Participants:</i>	Brand, Browner, Mock, Babhulkar, Hamdan, Zirkle, Vrahas, Musafir, Wilkins, Baldan	
Group B:	Training Programs for Orthopaedic Surgery – Narmada Hall	
<i>Facilitator:</i>	Marcos Britto Da Silva	
<i>Rapporteur:</i>	David Oloruntoba	
<i>Participants:</i>	Banskota, Dormans, Al-Kharusi, Naddumba, Mahaisavariya, Waddell, Singh, Al-Kharusi, Tuan, Coughlin	
Group C:	Training Programs for Non-orthopaedists – Mathura Hall	
<i>Facilitator:</i>	Bade Omolulu	
<i>Rapporteur:</i>	Nyengo Mkandawire	
<i>Participants:</i>	Joshipura, Cherian, Arora, Vukasinovic, Toma, Spiegel, Lima, Awais, Bunn, Gosselin, Quansah, Fisher	
Lunch – Poolside		12:35-1:35 PM

Friday, December 14, 2007 (continued)

Breakout Session IV: Role of Non-Governmental Organizations and International Orthopaedic Societies in Musculoskeletal Trauma Care: How Can we Stimulate Collaboration to Improve Treatment of Injuries Worldwide?		
Please use the following schedule:		
• 45-minute breakout session to discuss your topic		1:40-2:25 PM
• 30 minutes for facilitator and rapporteur to compile summary statement		2:25-2:55 PM
• 15 minutes (5 minute presentation and 10 minute discussion) for each rapporteur to report back to general assembly		2:55-3:40 PM
Group A:	Research Agenda – Gokuldwarka Room	
<i>Facilitator:</i>	Bruce Browner	
<i>Rapporteur:</i>	Wahid Al-Kharusi	
<i>Participants:</i>	Arora, Brand, Tuan, Omolulu, Dormans, Quansah, Mock, Awais	
Group B:	Collaboration on Educational Programs – Narmada Hall	
<i>Facilitator:</i>	Richard Coughlin	
<i>Rapporteur:</i>	Ashok Banskota	
<i>Participants:</i>	Vrahas, Toma, Babhulkar, Bunn, Mkandawire, Wilkins, Zhen-Sheng, Fisher, Oloruntoba	
Group C:	Working with Other Stakeholders: Government, Administration, Public Health Officials – Mathura Hall	
<i>Facilitator:</i>	Richard Gosselin	
<i>Rapporteur:</i>	Marco Baldan	
<i>Participants:</i>	Vera, Singh, Hamdan, Joshipura, Waddell, Vukasinovic, Britto da Silva, Howard, Spiegel, Naddumba, Mahaisavariya	
Closing Remarks	<i>Manjul Joshipura, Course Chairmen</i>	3:40-4:10 PM
Adjourn		4:10 PM

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