

Orthopaedic Surgery in the Peruvian Amazon

By Dustin L. Larson, MD

In late November 2013, I had the unique opportunity and privilege to participate in an orthopaedic outreach project to Pucallpa, Peru. Pucallpa is a low-lying port city in the Peruvian Amazon along Brazil's western border. A growing population of more than 200,000 people lives in Pucallpa. The residents eke out an existence as loggers, farmers, fishermen or vehicle drivers. Many of them live in slums of plywood and corrugated metal along the banks of the Ucayali River, a major Amazon River tributary.

Their shantytowns routinely arise and wash away with the natural ebb and flow of the river as it fluctuates 30 feet or more in a matter of days during the rainy season.

Orthopaedic trauma in Pucallpa is a prototypical example of an epidemic in the developing world that Dr. Lewis Zirkle describes as a disease conferred by emerging prosperity¹. The microeconomic expansion of jobs and personal income is far outpacing the macroeconomic development of public infrastructure such as health care, roads or transportation and workplace safety measures. In the confluence of these suboptimal circumstances are numerous individuals exposed



Ucayali River

1 Zirkle, LG. Injuries in Developing Countries—How Can We Help?: The Role of Orthopaedic Surgeons. *Clin Orthop Relat Res.* 2008 October; 466(10): 2443–2450.

Common family mode of transportation



to significant risk for orthopaedic trauma. In spite of several well-trained, diligent and tirelessly working surgeons in Pucallpa, the health care system is inadequately equipped to treat the number of patients and complexity of some of the problems they present with. During the slow process of improving education and the development of public infrastructure to help reduce the risk of orthopaedic trauma, there remains a necessity for timely and effective treatment of orthopaedic injuries and conditions.

With an appreciation for that need and as an expression of sincere personal faith, Dr. Peter A. Cole, MD (Professor, Orthopaedic Trauma, University of Minnesota), and his family founded a medical and surgical ministry in the Peruvian Amazon in 2004, *Scalpel at the Cross* (www.scalpelatthecross.org). He relates that this was the result of a series of providential events beginning in his childhood growing up in Venezuela and a developing relationship with a mission aviation family in the 1980s who had a presence in the Pucallpa region since 1966. For years, Dr. Cole invested in developing relationships within the local health system by joining surgeons and staff on hospital rounds and

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in clinic and providing teaching and education in various forums. The product of those relationships and collaboration was an understanding of the unique needs of the population and health system and ultimately, close integration of his group with local providers. This permits them to support, rather than undermine, the local health infrastructure with education, technical expertise and materials to address the unmet need of overflow capacity and complexity that is overburdening the system.

I first met Dr. Cole and learned about his project in Peru at the SIGN Fracture Care Annual Meeting in Richland, Washington. "Scalpel at the Cross" was presented there as a novel and model clinical outcomes program for short-term orthopaedic mission care in the developing world. Dr. Cole states, "I couldn't live with championing evidence-based medicine in my career, while going to the Amazon, operating, and then never knowing how my patient's did." The essential organizational structure involves a volunteer US-based medical and surgical team that travels to Pucallpa twice annually and a Peruvian General Surgeon who has full-time presence in Lima and Pucallpa and is compensated for post-operative care, follow-up, and data collection including x-rays and a standardized form. From 2007-2012, the group managed 127 operative patients (151 surgeries) and achieved an 81.9% follow-up rate over an average of 11.8 months and 3.7 follow-up encounters. In terms of post-operative clinical outcomes, the infection rate is 2%; wound healing rate 97.1%, fracture union rate 95.5%, and non-



Tibia-fibula non-union, untreated for 21 years.

union and mal-union rates are 3% and 1.5% respectively. It is important to remember that the majority of these patients have extremely limited means and highly unstable

living situations. These outcomes are remarkable if not only for the fact that follow-up requires the Peruvian surgeon to track down the patients in the jungle and shantytowns by moto-taxi, boat, and even float plane².



Jungle transportation

During the November 2013 trip, we worked at the facilities of Hospital Amazonico, a small government hospital in Pucallpa. The hospital donated clinic space and 2 operating rooms for our use. They also provided nursing support staff, anesthesia, basic equipment, and sterile processing for equipment and supplies brought by our group.

Clinic was organized to see between 80-100 patients per day. Patients with medical complaints and non-operative orthopaedic conditions were triaged for evaluation and treatment by a multi-disciplinary team that was able to provide joint injections, splinting, bracing, crutches, vitamins, over-the-counter medications, and help coordinating additional care. After clinic we compiled a list of patients with operative indications and triaged them according to the availability of time and resources to treat. These patients had problems as complex as any that we see at our Level I Trauma and tertiary centers in the States, including acute skeletal trauma, complex fracture non-union and mal-unions, osteomyelitis, gunshot wounds, chronic joint dislocations, advanced degenerative arthritis, symptomatic hardware, and brachial plexus palsy. Pre-operative

2 Torchia, MT. A Surgical Follow-up Program for Short Term Medical Mission Trips in a Developing Country. Presentation: from 2013 SIGN Annual Meeting, Richland, WA.



Clinic

planning occurred at the dinner table in Dr. Cole's jungle home. Central supply was a large storeroom also in Dr. Cole's compound filled with containers of donated and purchased equipment through which we carefully sorted to find every plate, screw, drill bit, guide, and suture that we would need for our planned cases.

Though reasonably equipped by any standard, the operating room was an austere environment. The patients were awake, having received



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excellent spinal anesthesia for lower extremity procedures, for example. There was one halogen operative light, no fluoroscopy, and limited access to many basic and routine instruments and equipment that we are accustomed to in the States. I had the great privilege and opportunity to learn from and work with a Peruvian surgeon, Dr. Cahua. Our work in the operating room was supported by a Canadian Missionary who provided assistance interpreting and a trauma equipment representative from Minnesota who coordinated all logistics of the operating room and personnel, and significantly improved the efficiency and productivity of the



OR 2 Hospital Amazonico, SIGN nail for femur nonunion

operative days. Routine team rounds occurred at the bedside each post-operative day. I have rarely observed patient fortitude and gratitude to that degree, especially in the midst of such suffering and poverty.

This was the richest educational and most personally rewarding experience in my medical career. The opportunities may be few in training or practice that truly consolidate your knowledge, technical capacity, and creativity in an environment like this where time and resources are so precious and limited. My heart for the underserved was deeply affected and my perspective on short-term orthopaedic work in the developing world was changed. It was my privilege to work with Dr. Cole



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and his team. Not a single day has gone by that I do not think about the patients I cared for in Peru. Thankfully, due to the organization of Scalpel at the Cross' follow-up program, I get to learn about their progress. This kind of educational opportunity was a significant complement to my training as an orthopaedic surgeon and should be promoted and supported during residency.