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## Why Are We Special? Limb Deformity is More Than an Overlapping Subspecialty



In 1951, Soviet Surgeon, G. A. Ilizarov unlocked from within bone a previously hidden capacity to form new functional osseous tissue. Sixty-five years later, the Limb Lengthening and Reconstruction (LLR) Surgery community is still struggling to define itself and become fully recognized by the established orthopedic community. This compromised status hinders surgeon education and patient care.

LLR surgery is still a relatively new subspecialty of orthopedic surgery. The North American Limb Lengthening and Reconstruction Society only became a member of the Board of Specialty Societies of the American Academy of Orthopedic Surgeons (AAOS) in 1999, and we have been working over the last several years to forge a dedicated limb deformity section in the educational program of AAOS. Without an educational section dedicated to limb deformity, scholarly submissions are forcibly placed into other categories leading to critique by reviewers who are not interested in and do not appreciate the important topics in limb deformity, often resulting in inappropriate rejections of good scholarly work. Furthermore, at the annual meeting, our community of surgeons cannot focus on limb deformity material by locating our section of the program as other surgeons can do in their orthopedic subspecialties.

Surgeons who subspecialize in LLR are involved in patient cases that include the whole body, with a variety of etiologies illustrated by the diverse referrals from other areas of orthopedics. There is apparent overlap with other subspecialties, including adult reconstruction, orthopedic trauma, foot and ankle, pediatric orthopedics, tumor, and upper extremity. However, LLR is a unique and distinct orthopedic subspecialty. We use the principles of deformity correction, recognizing the intimate relationships among the hip, knee, and ankle joints. Osteotomy is used to correct deformity and leg length discrepancy, adhering to the principles of the Ilizarov method. We use external fixation as well as internal fixation and perform limb salvage and joint preservation surgery. LLR surgery addresses both simple and complex cases with multi-apical deformity, bone loss, and infection in both children and adults. It is distinct from other orthopedic surgery subspecialties, and colleagues facing a complex patient problem not fitting neatly into an established category often consult a limb deformity specialist for an alternative orthopedic approach.

A dedicated Limb Deformity Service (LDS) does not compete with the other orthopedic services but is instead complimentary with unique perspective and surgical techniques.

There are currently only three dedicated limb lengthening and deformity fellowship programs in the United States that focus entirely on limb deformity treatment in both adults and children. The benefits of orthopedic subspecialization and increased volume in other disciplines have been well documented; however, despite increased awareness and practice of limb deformity surgery, it is rarely vested as a separate clinical service in an academic Department of Orthopaedic Surgery. Our experience with a dedicated LDS at Hospital for Special Surgery in New York City since 2005 supports the utility of such a dedicated service.<sup>[1]</sup> Significant clinical growth has occurred, and an environment has been created that has supported focused clinical and academic work. Surgical outcomes have been excellent and academic productivity has been substantial. Referral patterns both intramural and extramural suggest needfulness and an improved access for patients to this specialized care. Analysis of the procedures done suggested great diversity in anatomic locations and use of surgical techniques yet all focused on the discipline of limb deformity.

We found that between 2005 and 2013, annual outpatient office visits and annual surgical volume significantly grew. Surgical volume growth was similar to the growth of the Department of Orthopaedic Surgery. Higher volume is expected to improve clinical outcomes and value. In addition, increasing case volume indicates that there exists a previously unrecognized need that can be fulfilled by surgeons who work specifically in limb deformity. Our referrals were predominantly from orthopedic surgeons and from prospective patients doing their own internet research. Moreover, orthopedic surgeon referrals were predominantly intramural, which suggests that without the subspecialty service, the institution would have lost these patients. In addition, new patients have been drawn to the hospital because of the availability of the specialized care. Marketing of the service to increase patient and physician awareness and education is more readily done when there is a dedicated program. The fact that most referrals were from other orthopedic surgeons suggested that those who

do not specialize in limb deformity may be unable or unwilling to perform LLR surgery due to its specialized nature – highlighting the need for such a specialty service. This correlates with the growing trend in subspecialization of orthopedic surgery.

While the limb deformity subspecialty focuses on particular surgical cases, we have established that there is apparent overlap with other areas of orthopedic surgery.<sup>[2]</sup> For example, nonunions, malunions, and bone defects may be approached by a trauma orthopedist. Deformity around the knee, associated arthritis, and bone loss and infection after failed knee arthroplasty may present to an adult reconstruction orthopedist. A failed pilon fracture or ankle arthroplasty with infection, bone loss, and ankle contracture may show up in the clinic of a foot and ankle orthopedist. Limb deformity as a legitimate subspecialty of orthopedic surgery is characterized by our unique way of analyzing and approaching clinical problems and by our unique surgical techniques and tools. We focus on deformity analysis and the mechanical relationships of the entire lower or upper extremity. We know how to reconstruct bone loss, so we understand the importance of and we have the confidence to perform an aggressive debridement with removal of all dead bone. After all, we are the experts of growing new bone, reconstructing bone defects, and lengthening a short limb. We understand that limb shortening is an element of limb deformity – translation in the axial plane. Moreover, we, as surgeons, control the dimension of time with acute, gradual, and acute plus gradual correction options. We use plates, screws, static nails, antibiotic-coated nails, motorized lengthening nails, circular external fixators with rods, hinges, and hexapod struts, monolateral frames, and even joint replacement to correct limb deformity. Just as a professional golfer plays the game with a full bag of clubs pondering the optimal club for the particular shot, we choose the best tool and approach for the complex limb challenge before us.

There are many orthopedic surgeons around the world who focus on limb deformity, and subspecialty academic societies have developed in many countries. The recent unification and formation of an international congress and the formation of this very subspecialty journal will be remembered as an epic advancement for us. The recent process of deciding on a name for the new international congress, however, illustrated our identity confusion. I was privileged to be a part of the 55 international surgeons that voted on these issues, and the email group discussions were lively. After all, this is a group of surgeons who love the subspecialty of limb deformity and want to make sure it is named correctly.

The elements of names proposed and passionately discussed included, Ilizarov method, limb lengthening, bone reconstruction, deformity correction, limb alignment, realignment, skeletal repair, external fixation. The process

and debate represented the need to capture what makes us unique. We needed a name that was not too narrow but also not so generic that our identity was vague. There were those that insisted that external fixation was foundational, but many others felt that the particular tool of an internal implant or external fixator was secondary to the principles and methodology we use. In the end, the decision was for Association for the Application of the Method of Ilizarov- International Limb Lengthening and Reconstruction Congress.

In speaking with colleagues in Europe, Asia, and Australia, the lack of recognition we feel in the USA is experienced around the world. Large orthopedic organizations such as SICOT, EFORT, and AOA also do not have separate educational sections dedicated to limb deformity. It is rare for an orthopedic academic department to have a dedicated LDS. Without dedicated limb deformity sections and services, orthopedic residents and trainees are not getting optimal exposure and education to the critical principles and practice of this emerging subspecialty. They are not getting this critical knowledge both in their training programs and at the large orthopedic national meetings. The next generation of orthopedic surgeons and their patients will not realize the full potential of limb deformity expertise.

My friend, K. Tetsworth, eloquently wrote in a personal communication, “because it is off their radar it remains underappreciated and therefore generally ignored during training - hence, the problem remains and is self-perpetuating - only the guys already in the know appreciate how important the concepts are to understand, and that the principles are essential elements in every orthopedic subspecialty.”

To change this, we need to use political strategy. We need to become active in the general orthopedic organizations such as the AAOS and similar associations in all countries around the world. We need to become committee members and leaders who organize the annual meetings. Only then, can one of us stand up as a committee member and petition for a dedicated limb deformity section at the meeting.

Now that we have an international congress and our own dedicated journal, we can better communicate and work together toward this common goal. For example, a uniform sample letter petitioning for a limb deformity dedicated section can be available for all members to use and submit to their national orthopedic societies. A high volume letter writing campaign with a uniform message can be effective.

Comparative studies on patient outcomes, efficiency, and value between dedicated LDSs and nonspecialized centers represent an important area of research. My prediction is that these studies will show better outcomes and value for patients treated by dedicated limb deformity surgeons as has been shown in other orthopedic subspecialties.

As an international group, we need to come together with a unified voice to help the world orthopedic community understand why we are special. I propose that we further discuss this at our national and international meetings in the forum of symposia. With collaboration and discussion, we will come up with new ideas and strategies, which will in turn further energize this important evolution. Ultimately, our goals are to educate the next generation of surgeons and provide the best possible specialized care to our future patients.

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