
Preface

This book evolved from a series of scientific exhibits for the American Academy of Orthopaedic Surgeons' annual meetings, created on behalf of The Limb Lengthening and Reconstruction Society–North America (LLRS–NA). Our 2013 exhibit, “Complications of Limb Lengthening and Deformity Correction,” emphasized that switching the method of limb elongation from external fixation to intramedullary lengthening nails, although resulting in a far more comfortable experience for our patients, had not eliminated any of the potentially serious complications associated with limb lengthening, save for the eradication of pin and wire site pain, inflammation, and sepsis.

The LLRS–NA 2013 AAOS scientific exhibit, “Assessment for Deformity Correction: Identifying Hidden Deformities,” created by the senior author with the assistance of Janet Conway, MD of Baltimore, focused attention on the dangers of not fully defining both the obvious and hidden deformities before embarking on a limb realignment program.

In 2016, with the help of Dror Paley, MD of Miami, the senior author reviewed “The History of Limb Lengthening,” in an AAOS scientific exhibit, taking the viewer from the earliest attempts at limb elongation to the modern, fully implantable intramedullary lengthening nails.

Around that time, Ed Roschak, then CEO of Ellipse Technologies (now NuVasive Specialized Orthopaedics), manufacturer of the PRECICE® intramedullary nail, suggested that the senior author create a monograph summarizing the features of the aforementioned exhibits emphasizing, how knowledge of limb lengthening with external fixation systems teaches us to properly and safely use intramedullary lengthening devices.

The project expanded to encompass all such implants then available in North America. Fortunately, Mark Dahl, the junior author, was one of only two American orthopedic surgeons who had extensive clinical experience with all three intramedullary lengthening nails being used in North America. Thus, we were able to provide the reader with a comprehensive overview of the current status of the monograph's subject matter.

We also solicited clinical contributions from colleagues who helped produce the LLRS exhibits for the AAOS annual meetings, including Drs. Dror Paley, Rob Rozbruch, Austin Fragomen, John Herzenberg, and Janet Conway. These surgeons, along with Drs. Rainer Baumgart, Matthew Gardner, and Matt Dawson, generously

and unstintingly shared their experience and clinical cases with us for inclusion in this volume.

NuVasive also provided a grant to hire a talented artist and medical illustrator, Matthew Brownstein, to grace the pages of this monograph with outstanding images. We are most grateful for his contribution.

We have also included in this monograph an updated version of the cross-section atlas from the senior author's 1981 book, *Complications of External Skeletal Fixation: Causes, Prevention and Treatment*. We reasoned that the use of an intramedullary lengthening nail shares with the application of external skeletal fixation many transcutaneous protocols—percutaneous osteotomy, transverse locking screws, blocking screws, and guidance screws—inserted through minimally invasive incisions. Thus, an updated cross-section atlas seemed in order. In fact, we included a body part, the forearm, for which no foreseeable intramedullary lengthening implant is on the horizon, due to the narrow diameter of the involved bones. Nevertheless, engineering creativity often finds a way to solve such problems.

The reader should be advised that some of the applications of intramedullary lengthening nails illustrated in this monograph are “off-label”—not yet approved by the FDA for marketing in the USA. We have indicated the off-label usage when appropriate. The pioneering orthopedic surgeons who have contributed such cases to this book have sought to use existing implants in ingenious ways to solve serious clinical problems, always acting in the best interests of their patients. The results they have thus achieved bear witness to the resourcefulness of such practitioners.

Finally, by way of disclosure, we both serve as consultants for NuVasive and have royalty arrangements for elements of the PRECICE® nail and its derivatives. The senior author also receives royalties for Smith & Nephew's rancho cubes, used with their Ilizarov external fixation system and the Taylor Spatial Frame®.

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Intramedullary Limb Lengthening

Principles and Practice

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