Recovery Guide

Limb Lengthening and Complex Reconstruction Surgery

S. Robert Rozbruch, MD, Service Chief
Austin T. Fragomen, MD, Fellowship Director

Limb Lengthening and Complex Reconstruction Service (LLCRS)
Welcome to the family of the *Limb Lengthening and Complex Reconstruction Service* at the Hospital for Special Surgery (HSS). Our goal is to provide you, your family and friends with the knowledge and support needed to ease the surgery and recovery process. Our team is a group of dedicated professionals, specializing in your type of condition. We will guide you through your journey toward a better, more mobile, balanced, and fulfilled life.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Our Team</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Planning For Your Surgery</strong></td>
<td>6</td>
</tr>
<tr>
<td>Research Studies</td>
<td></td>
</tr>
<tr>
<td>Sleep Apnea/CPAP/BIPAP</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
</tr>
<tr>
<td><strong>Medications Prior To Surgery</strong></td>
<td>7</td>
</tr>
<tr>
<td>Herbal Supplements</td>
<td></td>
</tr>
<tr>
<td>OTC and Prescription Medications</td>
<td></td>
</tr>
<tr>
<td><strong>Surgery</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>After Surgery</strong></td>
<td></td>
</tr>
<tr>
<td>Preventing Blood Clots</td>
<td></td>
</tr>
<tr>
<td>Case Management</td>
<td></td>
</tr>
<tr>
<td>External Fixator Care</td>
<td></td>
</tr>
<tr>
<td>A Patient’s Guide to Pin Care</td>
<td>11</td>
</tr>
<tr>
<td>Internal Lengthening Intramedullary Nail</td>
<td>18</td>
</tr>
<tr>
<td>Bone Stimulator</td>
<td>19</td>
</tr>
<tr>
<td>Strut Adjustments</td>
<td></td>
</tr>
<tr>
<td>Sutures/Staples</td>
<td></td>
</tr>
<tr>
<td><strong>Physical Therapy</strong></td>
<td>20</td>
</tr>
<tr>
<td>Post Operative Physical Therapy Guide</td>
<td></td>
</tr>
<tr>
<td><strong>Nutrition</strong></td>
<td>29</td>
</tr>
<tr>
<td>Vitamin D, Calcium and Vitamin C Supplementation</td>
<td></td>
</tr>
<tr>
<td><strong>External Fixator Removal</strong></td>
<td>29</td>
</tr>
<tr>
<td>Follow-Up</td>
<td></td>
</tr>
<tr>
<td><strong>Cast/Brace Care</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>Prescriptions</strong></td>
<td></td>
</tr>
<tr>
<td>Pain Management and Pain Management Referral</td>
<td></td>
</tr>
<tr>
<td><strong>X-Ray, Medical Record and Hardware Requests</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>Forms, Letters and Paperwork</strong></td>
<td>32</td>
</tr>
<tr>
<td><strong>Important Hospital Telephone Numbers</strong></td>
<td>33</td>
</tr>
<tr>
<td><strong>Office Contact Information</strong></td>
<td>34</td>
</tr>
</tbody>
</table>
Dr. S. Robert Rozbruch, Chief

After graduating Magna Cum Laude from the University of Pennsylvania, Dr. Rozbruch attended Weill Cornell Medical College of Cornell University from which he graduated with honors in research. Residency training in Orthopaedic Surgery was followed by two fellowships. He did specialized training in Trauma as an AO fellow at the University of Bern in Switzerland. Additional training in adult and pediatric limb lengthening followed at the Maryland Center for Limb Lengthening & Reconstruction.

Dr. Rozbruch is the Chief of the Limb Lengthening & Complex Reconstruction Service at the Hospital for Special Surgery. He is a Professor of Clinical Orthopaedic Surgery at Weill Medical College of Cornell University. He is a member of several national medical societies including fellowship in the American Academy of Orthopaedic Surgeons, Orthopaedic Trauma Association, and ASAMI - The Limb Lengthening & Reconstruction Society of which he was President (2012-2013). He has presented his clinical and research works at national medical meetings and has authored numerous articles in medical journals and chapters in Orthopaedic textbooks.

Dr. Austin T. Fragomen, Fellowship Director

Dr. Fragomen attended medical school at the State University of New York Downstate College of Medicine. He excelled through a very hands-on surgical internship at Montefiore and Jacobi medical centers in the Bronx. He launched into his Orthopaedic residency training program, under John R. Denton, MD, at the Saint Vincent Catholic Medical Center. As chief resident, he took a strong interest in fracture care, limb reconstruction, and joint preservation surgery. He then relocated to San Francisco, California to dedicate himself to learning advanced techniques in surgery of the shoulder and knee with pioneer and innovator Eugene M. Wolf, MD. He returned to New York’s Hospital for Special Surgery to become their first fellow in Limb Lengthening & Reconstruction Surgery. He has presented his clinical and biomechanical research at medical meetings and has authored and edited articles for various Orthopaedic journals and textbooks. He has lectured extensively on related topics to residency training programs and in the community setting.

Skilled in the art of less invasive surgery, Dr. Fragomen will perform a sophisticated and comprehensive analysis of each patient to determine an optimal treatment plan. Whether performing an all-arthroscopic rotator cuff repair or mounting a percutaneous external fixation frame, the goal is always to minimize the trauma of surgery and maximize a rapid and functional recovery.

Dustin Quig, PA-C, Dustin is the Physician Assistant to Dr. S. Robert Rozbruch. He attended Penn State University where he graduated with Honors, earning a degree in Kinesiology. Following graduation, Dustin attended the Cornell University Physician Assistant program. While at Cornell, Dustin had a strong desire to pursue Orthopedics, completing an elective rotation at the Hospital for Special Surgery and writing his senior thesis on hip replacement surgery. After graduation Dustin joined the HSS Limb Lengthening team. In his spare time, he enjoys playing guitar, participating in both baseball and football, and exploring New York City.
Benjamin Odamten, PA-C, Benjamin Odamten is a nationally certified Physician Assistant on the LLCRS. He completed his Bachelor of Science degree at Utica College of Syracuse University in Biology and then went on to receive his degree in Physician Assistant Studies at Touro College. Prior to joining HSS, Benjamin worked as an Inpatient Adult Medicine Physician Assistant for six years at Montefiore Medical Center. With a strong medical background and a great passion for the restoration of mobility, Benjamin could not be happier to be part of the Limb Lengthening Team.

Erica Lenihan, RN, Erica is the Nurse Clinician on the LLCRS, working with Dr’s Rozbruch and Fragomen. She began working at the Hospital for Special Surgery (HSS) upon graduating from Dominican College with her Bachelor of Science Degree in Nursing. She transitioned to the LLCRS after working on the Adult and Pediatric in-patient floor at HSS for six years. Her interest and dedication to Limb Lengthening patients gives her the desire to improve and enhance their experiences whenever possible.

Chandrawattie Kewal, LPN, Chandrawattie Kewal began her studies at Farmingdale State University before attending the New York City Board of Education Licensed Practical Nursing Program. Chandra comes from a background of Geriatric and long term care and aspires to be a Nurse Practitioner. She enjoys various activities and learning new things. Chandra is currently working on her associate’s degree in nursing.

Omaira Dean, Omaira is the Office Manager, and Executive Assistant to Dr. Rozbruch. Mrs. Dean attended NYCT in Brooklyn, NY. She began working at HSS in 1998 and joined Dr. Rozbruch in 2001. As the Institute manager, she is an essential member of our team.

Kathiria Torres, Kathy is the Office Manager in the LLCRS for Dr. Fragomen. She attended St. John’s University with a business major. She joined Dr. Fragomen in 2007 where she plays a significant role in his practice.

Rosa Mora, Rosa is the Medical Secretary for Dr. Rozbruch’s team at the LLCRS. Rosa attended John Jay College of Criminal Justice with a Liberal Arts Major. She transferred to Hostos Community College to continue her education in liberal arts. She joined the Service in July of 2008 and has remained devoted to providing excellent service ever since.

Hennessy Sosa, Hennessy is the Medical Secretary for Dr. Fragomen in the LLCRS. She previously worked for Dr. Rozbruch for almost three years. She attended Dutchess Community College in Poughkeepsie and majored in Human Services; she graduated in May 2015. Hennessy majored in Human Services because she enjoys working with people and being able to help them and fulfill their needs to the best of their abilities. On her free time, Hennessy enjoy’s spending time with family, and friends. She also enjoys listening to music and shopping.

Fellows
We have two orthopedic fellows every year. They are fully trained orthopedic surgeons who study with us to learn techniques of LLCR surgery. They assist Dr’s Rozbruch and Fragomen in the operating room, help with patient care in the hospital and office, and conduct research studies.
PLANNING FOR YOUR SURGERY

We use a multi-disciplinary approach to your medical care. You will be referred to a Hospital for Special Surgery Medical Doctor for medical clearance 7 to 14 days prior to your surgery. Medical clearance is not permitted by an outside physician, unless you are undergoing ambulatory surgery. This Doctor will order and perform any and all tests needed to ensure that your medical safety is maintained. This Doctor will follow you throughout your hospitalization. He will organize, maintain and establish any and all medical treatments.

You may come to our office for a ‘Pre-Op Visit’. At this time, you can meet with a member of our staff and discuss what to expect before, during, and after your surgery. With your consent, preoperative photographs may also be taken. The risks, benefits, and expectations of the surgical process will be reviewed at this time. Post-operative care and expectations will also be reviewed. You will sign consent forms, and be given time to ask any questions. It is recommended that you bring a friend or family member to this visit. Although you will receive paperwork and documentation of everything discussed, there is a lot of information to remember. We also encourage you to come prepared with any questions.

You should plan on remaining in the hospital for two to four days after surgery, in most cases. Keep in mind the clothing adaptations that you will need to make. If you will have an external fixator, plan on wearing loose clothing that will fit over the frame (basketball pants with the side snaps work well). If you are undergoing arm or shoulder surgery, plan on wearing a button-down shirt.

Research Studies:
Medicine is forever changing. We are constantly performing research studies for Evidence Based Practice. If you meet the criteria, you may be asked to participate in one of our studies. These studies are critical to development of our specialty. Realize that participation in the study will never jeopardize your treatment or clinical outcome.

Sleep Apnea/CPAP/BIPAP:
Patients with sleep apnea, generally require an overnight stay in the Recovery Room to be monitored and observed following surgery. If you use a sleep apnea device, bring your mask and a list of your machine settings. DO NOT bring the CPAP/BIPAP machine. You will be followed by a respiratory therapist throughout your hospitalization.

Smoking:
Smoking cessation is extremely important prior to any surgery, especially orthopedic surgery. Smoking decreases the body’s ability to heal and impedes bone healing. Smoking increases your risk for infections, delayed healing, bone fractures, and amputations. We encourage you to contact your primary doctor for assistance with smoking cessation.

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MEDICATION’S PRIOR TO SURGERY

Certain medications and supplements, including prescription medications, herbal supplements and over-the-counter (OTC) products can cause serious complications after surgery. Complications can include: bleeding, altered cardiac functions, increased sedation, decreased immunity, decreased or altered bone healing. It is imperative that you notify us if you take any of these medications. We will inform you when and whether or not to, discontinue them. The following lists are not all-inclusive, which is why it is very important to inform us of all of the medications and supplements that you take.

HERBAL SUPPLEMENTS

The efficiency and safety of herbal products are not fully known. The Federal Drug Administration (FDA) does not regulate herbal products. The following herbals are known for their potentially harmful complications during and after surgery:

- Diet aids
- Echinacea
- Ephedra
- Feverfew
- Fish Oil
- Garlic
- Ginkgo
- Ginseng
- Kava
- Licorice
- Metabolife
- St. John’s Wort
- Valerian
- Vitamin E
- Willow bark

OTC AND PRESCRIPTION MEDICATIONS

There are medications that can complicate surgery, and its healing process. No prescription medication should be stopped without the doctor’s direction. Directions on when and how to stop the medication is imperative.

Acetylsalicylic Acid (Aspirin - ASA) products thin the blood and can cause excessive bleeding during surgery. The following are common products that contain Aspirin:

**Acetylsalicylic Acid Products:**

- Alka-Seltzer
- Anacin
- Arthritis Pain Formula
- Ascriptin
- Aspergum
- Pepto Bismol

**Aspirin Products:**

- Baby Aspirin
- Bufferin
- Darvon Compound
- Ecotrin
- Empirin
- Equagesic
- Fiorinal
- Genprin
- Halfprin
- Midol Max
- Norgesic
- Percodan
- Sine-Off
- Soma
- Triaminicin Cold
- Vanquish
- Zorprin

If you take Baby Aspirin (81mg) daily for your heart, you should continue this right up to the day of surgery.
Non-Steroidal Anti-Inflammatory (NSAID) products can increase bleeding, inhibit bone healing and inhibit bone growth. The following products contain NSAID’s:

<table>
<thead>
<tr>
<th>Advil</th>
<th>Feldene</th>
<th>Midol Cramp Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleve</td>
<td>Fenoprofen</td>
<td>Midol IB</td>
</tr>
<tr>
<td>Anaprox</td>
<td>Flecort Patch</td>
<td>Mobic</td>
</tr>
<tr>
<td>Ansaid</td>
<td>Flurbiprofen</td>
<td>Motrin</td>
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<tr>
<td>Arthrotec</td>
<td>Haltran</td>
<td>Nabumetone</td>
</tr>
<tr>
<td>Bayer Select</td>
<td>Ibuprofen</td>
<td>Nalfon</td>
</tr>
<tr>
<td>Cambia</td>
<td>Indocin</td>
<td>Naprosyn</td>
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<tr>
<td>Cataflam</td>
<td>Indomethacin</td>
<td>Naproxen Products</td>
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<tr>
<td>Clinoril</td>
<td>Ketoprofen</td>
<td>Nuprin</td>
</tr>
<tr>
<td>Daypro</td>
<td>Ketorolac</td>
<td>Orudis</td>
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<tr>
<td>Diclofenac</td>
<td>Lodine</td>
<td>Oxaprozin Products</td>
</tr>
<tr>
<td>Diflunisal</td>
<td>Mefenamic Acid</td>
<td>Pamprin IB</td>
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<tr>
<td>Dolobid</td>
<td>Medipren</td>
<td>Pennsaid</td>
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<tr>
<td>Etodolac</td>
<td>Meloxicam</td>
<td>Ponestel</td>
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<tr>
<td>Excedrin IB</td>
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<td>Piroxicam Products</td>
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Anticoagulants thin the blood and require close monitoring. These must be stopped prior to surgery. The following medications are used for anticoagulation therapy:

<table>
<thead>
<tr>
<th>Aggrenox</th>
<th>Fragmin</th>
<th>Pletal (Cilostazol)</th>
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<tr>
<td>Arixtra</td>
<td>Lovenox</td>
<td>Ticlid (Ticlopidine)</td>
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<tr>
<td>Coumadin (Warfarin)2</td>
<td>Persantine (Dipyridamole)</td>
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<tr>
<td>Effient</td>
<td>Plavix (Clopidrogel)2</td>
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*Coumadin and Plavix are both stopped 7 days before surgery.*

The following are miscellaneous medications that may cause surgical complications. Do not stop taking these pills unless instructed to do so by your physician:

<table>
<thead>
<tr>
<th>Furosemide</th>
<th>Macrobid</th>
<th>Phenelzine</th>
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<tr>
<td>Guaiifenesin</td>
<td>Macroantin</td>
<td>Tranylcypromine</td>
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<tr>
<td>Hydrochlorothiazide</td>
<td>Nardil</td>
<td>Tofranil</td>
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<tr>
<td>Imipramine</td>
<td>Nitrofurantoin</td>
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<tr>
<td>Lasix</td>
<td>Parnate</td>
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**General:**
- Bisphosphonates
- Growth Hormones
- Rheumatoid Products
- Smoking Cessation Products
- Steroids
- Weight Loss Medications
A nurse from the hospital will call you the day, evening, or night before your surgery. Last-minute instructions and time to report to the hospital will be provided. The nurse will be able to inform you which, if any, of your own medications should be brought into the hospital. Patient’s own medications are generally not allowed to be administered. (Specific exceptions can be made). However, in general, medications must be dispensed by the hospital’s pharmacy. If any controlled substances are brought into the hospital, they will be returned to a family member to be brought home. If your own medications are needed, be sure to bring them in their original bottles. Leave all narcotics at home.

Starting at midnight, the night before surgery, you are not permitted to eat or drink anything, unless otherwise instructed. Important medications should be taken the morning of surgery; i.e., blood pressure and heart medications, unless otherwise advised by the Doctor.

Please be certain to provide a list of all your medications, including any and all over-the-counter supplements to the operating room staff on the day of surgery. Please refer to the Medication/Supplement List on pages #3 and #4, and notify us if you take any of the listed medications.

When you arrive at the hospital, you must register. Once registered, you will go to the Holding Area. At this time, you will meet with nurses and physicians, including your surgeon and anesthesiologist. This is where you will be prepped for surgery. From the Holding Area, you will go into the Operating Room.

**AFTER SURGERY**

After your surgery is complete, you will be brought into the Recovery Room. The Recovery Room has different visiting hours from the rest of the hospital. You will be permitted visitors, but only at certain times. Dependent on your type of surgical procedure, you will either be transferred to the in-patient unit, or discharged home. If you are discharged home following surgery, you must be accompanied by someone else. The hospital will not allow you to leave alone.

**Preventing Blood Clots:**
Following surgery, blood clots, called deep vein thromboses (DVT), may develop. We take full precaution to minimize the incidence of blood clots. This development is unlikely. To prevent the incidence of DVT a small, massage-like, machine is used in the hospital on your legs. This mechanical device will enhance blood flow to the veins in your legs, helping to prevent blood clots. A medication to minimize the risk of blood clots will also be prescribed.

**Case Management:**
Every patient in the hospital has a case manager who assists with discharge planning and home services. If you are being admitted after surgery, you will meet your case manager up on the floor. It is at this time that you should advise her of your discharge needs (e.g., going home vs. rehabilitation center, transportation, home equipment, home nursing services).

**External Fixator Care:**
Reconstructive surgery usually requires stabilization of the bone. This is accomplished with either internal fixation (plates, rods, screws) or external fixation (scaffold outside of the limb). All external fixators require daily care and maintenance. Pin Care will need to be done on a daily basis, beginning two days after surgery, until the fixator is removed. While in the hospital, our nursing staff will educate and assist you with doing Pin Care. You are encouraged to have someone else who will be able to assist you at home learn how to do Pin Care as well. You may also refer to the Patient’s Guide to Pin Care on the next page. If you are going to a rehab facility, the nursing staff may use this pamphlet as a reference for proper care. If you are being
After discharged home, any family or friends assisting you may use it as their guide as well. A prescription for Pin Care supplies will be provided upon hospital discharge. Certain pharmacies perform medical supply orders, most do not. In most cases, your insurance company can direct you to a medical supply company within your insurance network. It usually takes a couple of days to obtain your supplies. The discharging nurse will supply you with the necessary equipment needed for those couple of days at home.

You are permitted, and encouraged, to take a daily shower. This may begin four days after surgery, unless otherwise advised by us. It is best to clean the frame and extremity with antibacterial soap (e.g., Dial or Phisoderm) and a freshly laundered washcloth. Use the washcloth like floss around the pin sites. Johnson’s baby shampoo is also a good choice if you have sensitive skin. You are permitted to swim in a chlorinated pool 4 days after surgery. You **MAY NOT** take a bath, use a hot tub, or swim in a lake, ocean or pond while wearing an external fixator.

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**Obtaining Pin Care Supplies:**
You will be discharged from the hospital with a prescription for pin care supplies. If home care has been arranged, your supplies are typically obtained through the home care agency assigned to your case. If not, you can have your local pharmacy or medical supply store order the supplies. If you are unable to obtain the supplies in this manner, and have insurance coverage for wound care supplies, contact your insurance carrier for a list of medical supply companies that can be used. A small amount of supplies will be provided from the hospital upon discharge as well.
Patient’s Guide to

Pin Care

Limb Lengthening and Complex Reconstruction Surgery

S.Robert Rozbruch, MD
Austin T. Fragomen, MD

Mono-Lateral Frame
Circular/Ilizarov Frame

S.Robert Rozbruch, MD
Austin T. Fragomen, MD
Why:
Pin care is important in the prevention of infection for Circular and Mono-lateral frames.

Supplies Needed:
- Gloves
- Sterile Cup
- Sterile Cotton Swabs
- Normal Saline
- Hydrogen Peroxide
- Scissors
- Gauze Wrap
Frequently Asked Questions:

1. Can I take a shower?
   In most cases, yes. In fact, a daily shower is recommended as part of the proper Pin Care procedure.

2. What kind of soap should I use?
   An anti-bacterial soap should be used to clean the frame and the surrounding area. Allow the water to run on the frame. If the skin gets dry, stop using soap on that extremity.

3. How often should Pin Care be done?
   Once daily pin care should be done immediately following a shower.

4. Where do I get the supplies to do my Pin Care?
   The Hospital will give you supplies for a couple of days to get you started and a prescription for supplies for the remainder of your Pin Care. (Insurance may or may not reimburse for supplies.)

5. How long do I continue to do my Pin Care?
   Pin Care must be done daily until your frame is removed.

6. How often should I change the Pin Care solution?
   A new solution should be mixed on a daily basis.
Steps for Pin Care:
(Variations and other interventions are to be made by the Doctor only).

1. Wash hands and apply gloves. Remove gauze dressing.

2. Shower using anti-bacterial soap on frame area. Run water on frame area.


4. Place sterile cotton swabs in the solution.

5. Use only 1 cotton swab per pin site.
6. Apply cotton swab to pin site with moderate pressure, never leaving the site. Go around the pin site and then up the pin.

***If contact is lost with the pin site (where the pin enters the skin), use a new cotton swab. Once the cotton swab is drawn up the pin, don’t go back down.

Do not use the same cotton swab on another pin.

7. Wrap pins in groups/clusters with gauze wrap.

*Mono-Lateral Frame Exception to Step 7
The gauze should be wrapped around the frame from the upper pins to the lower pins; positioned between the skin and the frame.
Do:

- Follow the Pin Care directions exactly, using proper Pin Care technique.
- Call the doctor’s office for a follow-up visit.
- You may go into a pool after 4 days, after seeking surgeon’s approval.
- You are NOT allowed to go into the ocean or a lake.

*Call your doctor at the first sign of infection (see next page).*

Don’t:

- Don’t allow animals to lick the frame area.
- Don’t use the same cotton swab on more than one pin site.
- Don’t use the same cotton swab if contact is lost with the pin site (where the pin enters the skin). Use a new cotton swab.
- Once the cotton swab is drawn up the pin, don’t go back down.
SIGNS OF INFECTION:

- Increase in pain level
- Redness/heat on skin
- Drainage *(some bleeding from the pin site is normal during the first week.)*
- Fever
- Numbness/tingling

Contact your doctor immediately if you exhibit any of these signs.
Internal Lengthening Intramedullary Nail:
• An alternative, in certain specific circumstances, to external fixation is the Internal Lengthening Intramedullary Nail. It allows for bone lengthening without an external fixator. It is adjusted three to four times per day with an external magnet. For the Precice Lengthening Nail instructions, you may visit [http://www.ellipse-tech.com/?q=ip](http://www.ellipse-tech.com/?q=ip), view the video at [http://youtu.be/HDi-m_t5zhM](http://youtu.be/HDi-m_t5zhM), and follow the below instructions.

• Magnet free safety zone:
  o Remove all metal items from your clothing or body
  o Do not use magnet within 2 feet of unattached metal
  o Do not have any electronic devices within 2 feet that might get damaged by magnetic field (cell phones, credit cards)

• Plug magnet in
• Place magnet over marking on leg. There is a sticker to show correct orientation:

  ![Diagram of Internal Lengthening Intramedullary Nail](image)

• Press magnet firmly down on leg
• Press F1 to start lengthening. It is programmed to lengthen 0.33 mm and takes about 2 minutes to complete
• Machine will stop when session is complete
• Press top left arrow if blinking to reset
• Unplug magnet
• Do 3 to 4 times per day (as specifically directed)
• When marking on leg starts to fade, draw over it with a marker
Bone Stimulator:
Bone stimulators are used to promote osteotomies and bone lengthening procedures to heal. Electrical stimulation and/or ultrasound, are painless non-invasive modalities that help fractures heal. We often use them as an adjunct to our routine treatment. The device can be used with an external fixator. The location is customized for each individual. The stimulator is a small, lightweight external device which is usually worn at night for approximately 3 months.

Strut Adjustments:
If you have an external fixator, and if warranted, you will be given and taught how to do your ‘adjustment schedule’. It is imperative that this schedule **NOT** be completed all at once during the day. Moving bone via the struts, is best done slowly and regularly. It hurts less, creates better bone, and is better for the soft tissues.

### Prescription

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Strut 1</th>
<th>Strut 2</th>
<th>Strut 3</th>
<th>Strut 4</th>
<th>Strut 5</th>
<th>Strut 6</th>
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<td>145</td>
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<td>118</td>
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<td>106</td>
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### Strut Change-Outs

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<th>Strut</th>
<th>Overlap Interval</th>
<th>Strut Change</th>
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<tr>
<td>a</td>
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<td>(Green)</td>
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- **Strut adjustments start on the date for “Day 1” as shown in the picture above.**
- **Go Slowly!!** Break the struts up into three groups (i.e., struts 1 & 2, struts 3 & 4, struts 5 & 6). Only adjust one group at a time (i.e., struts 1 & 2 in the morning, struts 3 & 4 at noon, struts 5 & 6 in the evening). Some patients find it easier to group the struts by visibility,
● especially if they need assistance with the back struts. You will be taught strut adjustments during your stay in the hospital. (You may also refer to the website video).

● In terms of gradualness, turn each strut only 1mm at a time. Look at all of the struts in the morning. This means that some struts will need to be broken up over the day. If a strut needs to be turned more than 1mm, you will turn it more than once in the day.

● If you miss a day, DON'T TRY TO MAKE IT UP!!! This is very “anti-gradual”. If you miss a day, simply continue the schedule one day behind.

● If you fall two days behind, DON'T TRY TO MAKE IT UP!!! Instead, if you fall two days behind, CALL THE OFFICE for further direction.

● The highlighted column in the above picture (green) indicates that a strut needs to be changed. Your appointment needs to be on a day that is highlighted. The strut will be changed in the office.

Beware: struts can move by themselves! Even after completion of strut adjustments, all strut numbers and connections should be checked daily to ensure that proper settings are maintained.

You may be provided with a foot plate/night splint or darco shoe (surgical walking shoe). The foot plate will aid in maintaining your foot in a neutral position. A darco shoe would be used while walking and bearing weight. These should be removed 2-3 times per day for 30 minutes at a time. The foot plate should be cleansed daily. This will reduce the likelihood of any skin irritations.

Sutures/Staples:
You will be discharged from the hospital with either sutures or staples. If you are discharged from the hospital with the original operative dressing, remove the dressing 2 days after surgery. Follow the above directions if you have an external fixator. If your surgery does not include an external fixator and you are discharged with staples or sutures, you may shower 4 days after the date of surgery. Staples and sutures will be removed at your first post operative visit in the office 2 weeks after surgery. Please remember to call the office to schedule your post operative visit.

PHYSICAL THERAPY

Stretching the joints after surgery is important. Exercise for range of motion of the joints above and below the bone cut is critical. For example, the knee and ankle must be exercised when having a tibia procedure. As the adjustments are being done, the bone is growing longer. We want to ensure that the soft tissue also stretches. Range of motion exercises for those undergoing ankle distraction surgeries is also imperative. You will be taught basic stretches and exercises by our Physical Therapists' while in the hospital. Physical Therapy will be ongoing at home and continues with out-patient therapy after your first post-operative visit.

The following are specific exercises for external fixator patients. They should be completed on a daily basis. They are divided into ‘Tibia’, ‘Femur’, ‘Hinged Foot/Ankle’, and ‘Fixed Foot/Ankle’. You may also view these exercises at http://www.youtube.com/watch?v=hE8m9Ujn104. Modifications to these exercises may be necessary dependent on your particular situation.
Calf Stretch:
Sit on bed as shown with your knee straight. Use your green stretch strap to pull your foot back towards you.

Hold for ________ seconds
Perform ________ repetitions ________ times a day

Passive Knee extension with hand:
With your foot on a towel roll or pillow, use your hands to gently press down above your knee to help flatten in out on the bed.

Hold for ________ seconds
Repeat ________ repetitions ________ times a day.

Knee Flexion Step 1:
Sit in a chair on a hard floor with socks on.
Slide your ________ foot backwards as far as tolerated to allow for bending of your knee.

Perform ________ repetitions ________ times a day.

Knee Flexion Step 2:
Cross your legs at the ankle and use your good leg to push your ________ leg backwards to feel more of stretch.

Then slowly return to the starting position.
Perform ________ repetitions ________ times a day.
Active Assitive Knee Extension:

Sit in a chair.

Put your good leg behind your _________ leg at the ankles.

Use your good leg to help straighten your _________ leg until your knee is straight.

Perform _________ repetitions _________ times a day.

Ex-fix Heel Slides Step 1:

Start with your _________ leg straight on the bed

Ex-fix Heel Slides Step 2:

Slide your _________ heel back towards your buttocks

Then slide back to the starting position.

Be sure to control the entire movement smoothly.

Perform _________ repetitions _________ times a day

Proper resting position type 1:

Place a towel roll under your _________ ankle. Gently relax your _________ leg to allow your knee to slowly lower down to the bed.

Do throughout the day when not ambulating.

Proper resting position type 2:

If your fixator extends into the foot place firm object under the last ring of you external-fixator or under your ankle if frame does not cover your foot.

This allows your knee to become as straight as possible (flat on the bed)

Do throughout day when not ambulating
Ex-fix SLR Step 1:
Gently squeeze your ________ knee towards the bed.  
Bend the same foot back towards you.

---

Ex-fix SLR Step 2:
Keeping your knee straight, lift your ________ leg of the bed to a height of 12-18 inches.  
Hold ________ seconds  
Perform ________ repetitions ________ times a day
Femur

**Knee Flexion: Dangle**
Sit in a chair or on the edge of your bed and let your operated leg just hang downwards with gravity. The operated leg can be supported by the opposite leg. The goal is right angle (90 degrees).

Perform ________ repetitions _________ times a day

**Knee Flexion Step 1:**
Sit in a chair or on the edge of your bed

**Knee Flexion Step 2:**
Slide your _________ foot backwards as far as tolerated to allow for the bending of your knee. Use your good leg to assist your _________ leg further backwards for a greater stretch. Goal is right angle (90 degrees).

Then slowly return to the starting position.

You may want to put your foot on a towel to allow the foot to slide easier.

Perform ________ repetitions _________ times a day
**Femur**

**Knee Extension:**
Sitting in a chair or on your bed, slowly try to straighten out your _________ leg so your knee is fully straight and then return to the starting position.

You may use your _________ leg to assist your leg upwards if necessary.

Perform __________ repetitions _________ times a day

---

**Heel Slide Step 1:**
Start with your _________ leg straight on the bed

---

**Heel Slide Step 2:**
Slide your _________ heel back towards your buttocks. Then slide back to the starting position.

Be sure to control the entire movement smoothly.

Perform __________ repetitions _________ times a day

---

**Passive Knee Extension:**
Place a towel roll under your _________ ankle to allow your knee to become as straight as possible.

This is a good resting position and should be used throughout the course of the day.

---

**Prone Lying:**
Lie on your stomach _________ times a day for _________ minutes at a time.

This will allow for stretching of your hip flexors

---

_cont.
Prone Knee Flexion:
Lying on your stomach, slowly bend your __________ knee as shown.
Perform __________ repetitions __________ times a day

SLR Step 1:
Gently squeeze your __________ knee down towards the bed.

SLR Step 2:
Keeping your knee straight, lift your __________ leg off the bed to a height of 12-18 inches.
Hold for __________ seconds.
Perform __________ repetitions __________ times a day.
Hinged Foot/Ankle

**Ankle Active PF/DF Step 1:**
Unlock frame as instructed during your Physician Assistant or Physical Therapist. Place firm object under top ring so your foot ring can clear the bed.

Bend your __________ foot back towards you as far as possible.

**Ankle Active PF/DF Step 2:**
Slowly push your foot away from your body and try to point your toes towards the opposite wall.

Perform repeatedly in a slow fashion so your foot goes all the way towards you then away from you.

Perform __________ repetitions __________ times a day.

**Calf Stretch with strap:**
With your frame unlocked.
Place your green strap around the ball of your foot as shown. Gently pull the strap so your foot bends back towards you.

Hold for __________ seconds

Repeat __________ repetitions __________ times a day.

**Great Toe ROM Step 1:**
Gently use your hands to stretch your toes back towards your body.

If you cannot reach, have someone perform for you.

**Great Toe ROM Step 2:**
Gently use your hands to stretch your toes away from your body.

If you cannot reach, have someone perform for you.

Perform __________ repetitions __________ times a day.
Great Toe ROM Step 1:
Gently use your hands to stretch your toes back towards your body.
If you cannot reach, have someone perform for you.

Great Toe ROM Step 2:
Gently use your hands to stretch your toes away from your body.
If you cannot reach, have someone perform for you.
Perform________ repetitions________ times a day

Forefoot Stretch with Strap:
Place your green strap around the top portion of your foot as shown.
Gently pull the strap back towards your body so your forefoot bends back as well.
Hold for_________ seconds
Perform________ repetitions________ times a day
The food you eat can greatly impact your recovery and healing. A nutrition consultation can be obtained while admitted to the hospital. Proper nutrition can prevent complications such as constipation as well. Focusing on whole grains, whole foods (i.e., fruits and vegetables) and proteins are important. Whole grains and whole foods will assist in preventing gastrointestinal problems in addition to supplying your body with vitamins and minerals. Your body will require ample amounts of protein for healing. Good sources of protein are meats, fish, beans, nuts, and dairy products including milk and cheese. We also recommend a daily probiotic for those on antibiotics.

Certain medications can be inhibited by some foods and alcohol. For example, alcohol intake can significantly inhibit the effectiveness of antibiotics. Alcohol should be avoided if you have been prescribed antibiotics. **Alcohol can have a fatal interaction with narcotics.**

**Vitamin D, Calcium and Vitamin C Supplementation:**
Vitamin D is required for bone growth and remodeling. If indicated, blood work will be done to determine the dose of Vitamin D for your surgery. Based on this blood level, the proper dosage of Vitamin D supplementation will be prescribed. Vitamin D cannot adequately be absorbed by the body without calcium.

Adequate amounts of calcium are required for the body to function and heal. Calcium Citrate is recommended over any other calcium supplement. If it is necessary for you to take calcium for your surgery, you will be advised to take ‘Citracal Maximum, 2 tablets by mouth two times a day for 12 weeks.’ Calcium supplements can interact with different prescription medications, including antibiotics (Doxycycline), bisphosphonates (these should be stopped before surgery) and high blood pressure medications. You may need to take the calcium supplements a few hours before or after taking the prescription medications. Ask your pharmacist about the possibility of any interactions. Dependent upon your past medical history or blood work results, an endocrinology consultation may be needed to improve your healing ability.

Our protocol also consists of Vitamin C supplementation. Vitamin C assists with collagen formation. If it is necessary for you to take Vitamin C for your surgery, you will be advised to take ‘Vitamin C, 500mg per day for 12 weeks.’ Continuation of these supplements, beyond the initial 12 weeks prescribed, may be needed.

**EXTERNAL FIXATOR REMOVAL**
When your external fixator is ready for removal, a date will be scheduled for removal in the operating room. Once removed, the bone has lost support from the external fixator. You will ‘take a step back’ and limit weight bearing to 50% while returning to the use of crutches for about two weeks. This may be modified on a case-by-case basis. We recommend that you continue to be active during this time, but do not push yourself too hard. If a brace is prescribed, it can be removed for gentle range-of-motion exercises. **You must leave the hospital with a friend or family member.**

**Follow-up:**
**Call to schedule a follow-up appointment** in the office about two weeks after surgery. At that time, your cast (or brace) will be removed and a new cast applied. You will typically be allowed to progress to full weight bearing at this time, and given a prescription for physical therapy.
CAST / BRACE CARE

A cast or brace may be used after surgery to support and protect the bones and soft tissue. They reduce pain, swelling and muscle spasm. Swelling can occur within the cast. It is very important to prevent excessive swelling. Remember to elevate the casted extremity, preferably above the level of your heart. Moving your toes (or fingers) will promote swelling reduction. It is extremely important NOT to stick anything into the cast. If you become itchy within the cast, IF AND ONLY IF your incisions are healed, you may use a hair dryer on COOL setting and blow air into the cast. This will relieve moisture and itching. In severe cases of itching, low doses of Benadryl may be taken. Keep the cast dry. Use a bag to cover the cast when showering.

Contact our office immediately if any of the following occur: increased/abnormal pain, numbness/tingling in your toes or fingers, burning or stinging, excessive swelling below the cast, loss of movement of the toes or fingers, skin discoloration (pale, blue, dusky color). You also need to contact us if the cast gets very wet.

PRESCRIPTIONS

It is best if refill prescriptions are written and given to the patient at follow-up appointments. If a refill is needed prior to your next appointment, please contact the office at least one week prior to completion of the medication. Narcotics/pain medications are often not permitted by the pharmacy to be called in over the phone. The staff cannot send prescriptions overnight via alternative mail carriers.

Physical Therapy (PT) and Occupational Therapy (OT) prescriptions will also be provided at follow-up appointments. If a PT or OT prescription renewal is required prior to your next appointment, please provide the office with either a fax number or mailing address.

Pain Management and Pain Management Referral:

Your recovery and rehabilitation is greatly affected by the management of your pain. Your pain management requires specialized care. There are situations where patients will be referred to a pain management specialist. A Pain Management Physician is a Doctor who specializes specifically in pain management. These Physicians have cutting-edge techniques to control your pain. He would manage and adjust your current pain medication regimen and construct a regimen which best suits your individual pain needs. He would also provide you with your pain medication prescriptions. In addition, when the time comes, he will create a plan of care for medication discontinuation. Those previously treated by a Pain Management Physician will automatically be referred back to them. We recommend, but you are not limited to using a Physician here at the Hospital for Special Surgery.

Following your surgical procedure, you can anticipate post operative pain. Patients experience pain differently and the amount of medication needed varies substantially. The vast majority of patient’s pain is able to be controlled with the following medication regimen, or less. The below list of medications is the maximum dosage of pain medication our office will provide:
**Long Acting:**
Oxycontin Extended-Release 10mg (1-2 tab(s) by mouth every 12 hours; max: 4) or similar drug

**Short Acting:**
Percocet 10/325mg (1-2 tab(s) by mouth every 4-6 hours; max: 12)
Norco 10/325mg (1-2 tab(s) by mouth every 4-6 hours; max: 12)

Pain typically decreases during the first week after surgery. If you are making gradual adjustments to an external fixator, or intramedullary lengthening nail, pain typically decreases when adjustments are completed.

You should continually be working towards decreasing the dosages of your pain medication. Some patients do not require narcotics at all. Always work towards that goal. If you are discharged on a prescription regimen that is in excess of the above prescription guidelines, it is to be understood that you should wean down from your discharge dosages to the above mentioned dosages for pain management.

If you are unable to wean down from these excessive dosages you will need to be followed by a pain management specialist (either at HSS or locally) to obtain pain medication in excess of the above mentioned regimen.

---

**HSS Pain Management Physicians**

<table>
<thead>
<tr>
<th>Dr. Robert Griffin</th>
<th>212-774-2944</th>
<th>Dr. Daniel Richman</th>
<th>212-606-1768</th>
</tr>
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<tbody>
<tr>
<td>Dr. Semih Gungor</td>
<td>212-774-2176</td>
<td>Dr. Seth Waldman</td>
<td>212-606-1686</td>
</tr>
<tr>
<td>Dr. Vladimir Kramskiy</td>
<td>646-797-8490</td>
<td>Dr. David Wang</td>
<td>212-606-1646</td>
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**X-RAY, MEDICAL RECORD AND HARDWARE REQUESTS**

**X-Ray Requests:**
Copies or CD’s of x-rays, or any radiological exam, taken at the office or hospital may be obtained through the radiology department by calling 212-606-1134. Office personnel are not permitted to dispense these requests.

**Medical Records Requests:**
Copies of office dictated notes, medical reports and test results may be obtained with a written request. The request must indicate the patient’s name, date of service requested and location/fax # of where to send the record to. Please allow ample time for the request to be completed and sent. In-patient medical record requests may be obtained through the hospital’s medical record department by calling 212-774-4845. Please allow ample time for all medical record requests.

**Hardware Requests:**
Removed internal and external hardware may be obtained for personal possession. The request for external hardware should be conveyed to your surgeon prior to its removal. Internal hardware should be conveyed to the office staff. Internal hardware requests must be in writing on a designated form. Internal hardware may take months to be obtained following processing through the hospital.

**FORMS, LETTERS AND PAPERWORK**
We are happy to assist you with any forms, letters or paperwork that you may need. It is best if the patient drafts the letter/completes as much of the paperwork as possible for the office staff. This will ensure complete and correct transmission of information. We will edit the forms and letters appropriately. Please ensure that you give us ample time to complete whatever it is that you need.
**IMPORTANT HOSPITAL TELEPHONE NUMBERS**

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<td>Access Private Nursing Service</td>
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<tr>
<td>Admitting</td>
<td>212-606-1241</td>
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<tr>
<td>Belaire Guest Facility/Hotel</td>
<td>212-606-1989</td>
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<td>Call Center</td>
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<td>Case Management</td>
<td>212-606-1271</td>
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<td>Coast To Coast</td>
<td>212-606-1921</td>
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<tr>
<td>Family Atrium/Waiting Room (4th Floor)</td>
<td>212-774-2201</td>
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<tr>
<td><strong>Hospital for Special Surgery Main</strong></td>
<td><strong>212-606-1000</strong></td>
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<tr>
<td>International Center</td>
<td>212-606-1186</td>
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<td>Radiology Records/Copies</td>
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</tbody>
</table>
## Office Contact Information

### Office Location
519 East 72nd Street, Suite 204
New York, NY 10021

### Mailing Address
535 East 70th Street
New York, NY 10021

### Hospital Address
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www.LimbLengthening.com
www.hss.edu/limblengthening

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