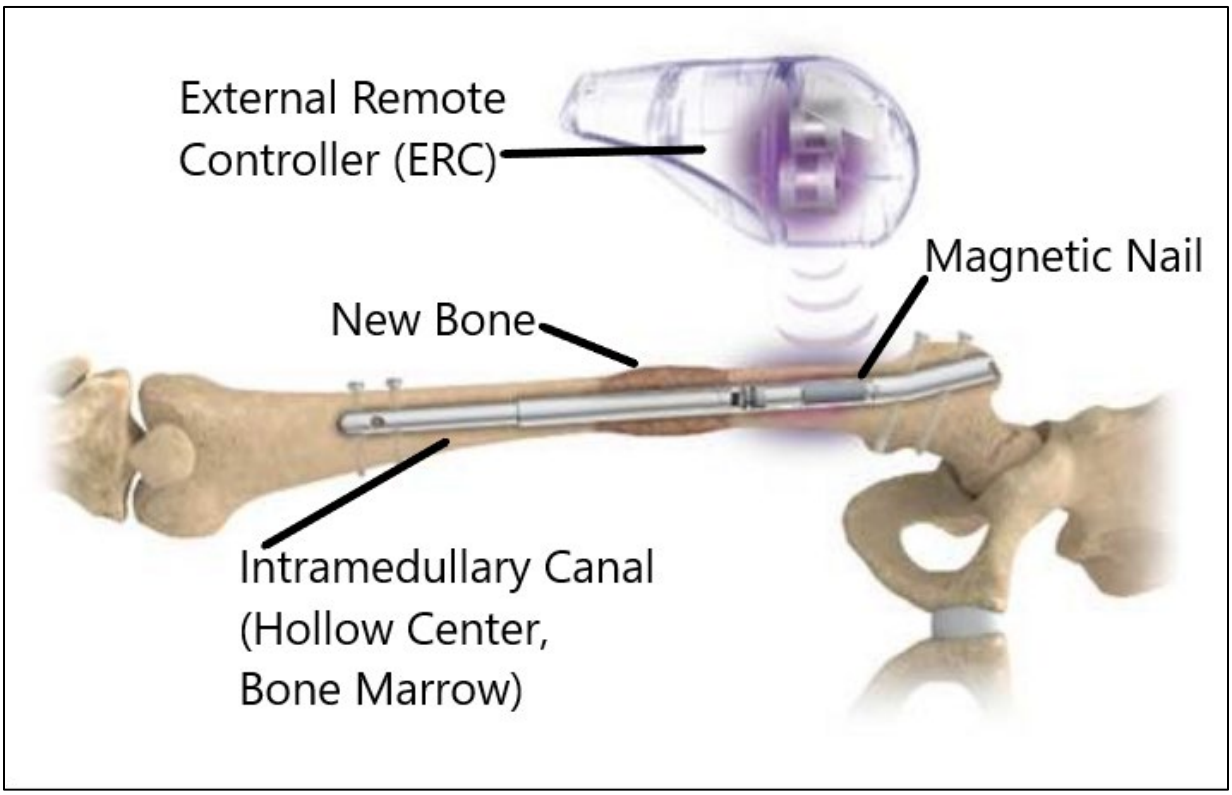
UCSF Benioff Children's Hospitals

**Division of Orthopaedic Surgery**
**Limb Lengthening and Complex Reconstruction Center**
**https://www.ucsfbenioffchildrens.org/clinics/limb-lengthening-and-reconstruction-center**
**LimbDifferences@UCSF.edu**
**(877) 822-4453 (877-UC-CHILD)**

# Limb Lengthening Via an Internal Lengthening Nail: Patient Instructions

**Intramedullary Lengthening Nail:**




*1 Magnetic Lengthening Nail: is inserted into the center of the bone and is lengthened with an external remote control (ERC)*

Limbs can be lengthened by devices that are completely inside of the bone. This form of lengthening takes advantage of the body's natural ability to grow bone. This process minimizes discomfort as there are no pins or wires connecting the bone to a lengthening device (external fixator) outside the skin. Based on the principle of gradual correction, the body fills in the gap between the two bone ends with new bone and increasing length. After reaching the desired length, the device remains in place until the bone fully matures or consolidates. Based on the amount of lengthening and quality of lengthening new bone, the entire process can take a few months to complete before the patient can walk without crutches. It is extremely important to do physical therapy exercises daily at home and 2-3 times/week with a physical therapist in order to avoid joint stiffness, contractures as the bone is lengthened, and the surrounding muscles and tendons need to stretch to accommodate the new bone length.

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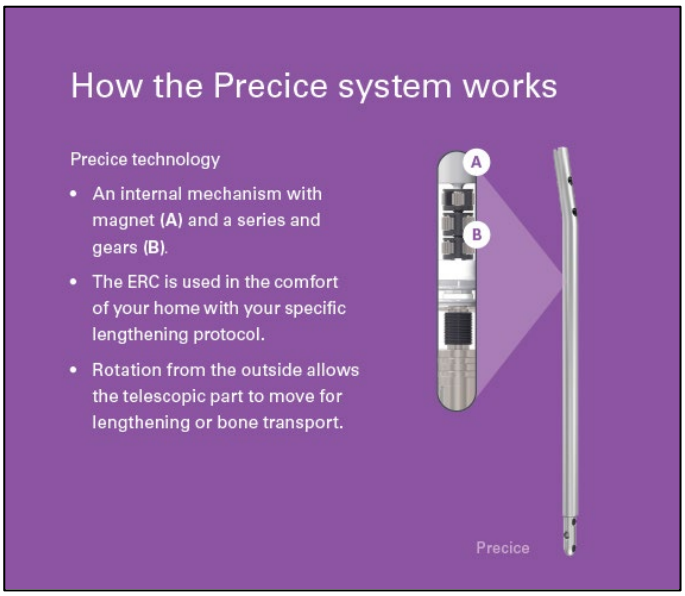
## Procedure Details:

**Surgery:** Under general anesthesia the surgeon cuts the bones in half through a small (typically 1 inch long) incision using special instruments that do not injure the tissues surrounding the bone, which helps to preserve the bone covering (periosteum) that will help make new bone. Once the bone is cut the "lengthening nail" is implanted through a 1–2-inch incision into the intramedullary canal (bone marrow or hollow center).




**Discharged home**: Once the patient is comfortable and able to walk with crutches or a walker, they are cleared to go home, which is typically 1 to 2 days after surgery. The skin stitches are dissolvable and the incisions are typically covered with a dry gauze and tape. A leg brace is often prescribed to be used for a few hours daily.

**Latency phase:** Between 5–14 days after surgery, the patient starts the lengthening protocol under the doctor's supervision. The bone ends are slowly stretched millimeter by millimeter through the internal lengthening device using the External Remote Controller (ERC) every day. The patient holds the ERC unit on the skin directly above the implanted device and pushes a button to control the lengthening for approximately 2 to 4 minutes, 2 to 4 times a day.

**Distraction phase**: Progress is monitored with weekly or bi-weekly office visits and X-rays to monitor the progressive limb lengthening. During this time, the patient will be attending physical therapy sessions, twice a week and doing daily exercises at home to maintain range of motion of your hip, knee, and ankle. They will be using crutches (or a walker) but cannot put full weight on the leg that is being lengthened.

**Consolidation phase**: During this time, we will monitor the patient's bone healing and hope to see range of motion progressively improve in bi-weekly or longer spaced visits. At this time, we will also begin to advance the patient's weight bearing status and physical therapy activities, as they transition back into previously tolerated activities.

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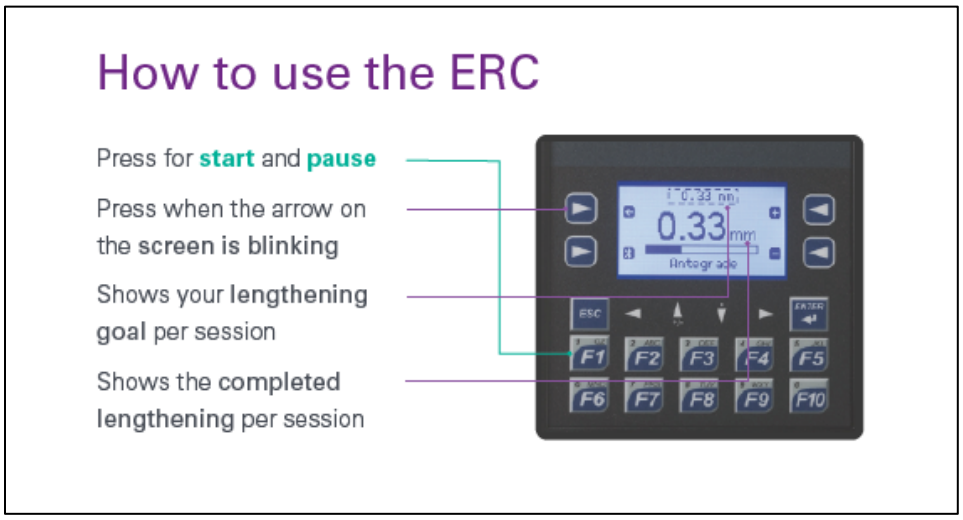
**Lengthening Schedule:**
The ERC should be used 2-4 times a day for approximately 2-4 minutes each session, as instructed.

**Lengthen the Nail:**
The patient holds the ERC unit on the skin directly above the implanted device and pushes a button to control the lengthening for approximately 2 to 4 minutes




**Tips:** Follow your weight bearing restrictions prescribed by your doctor at ALL times. Avoid wet floors (rain, ice, snow) because you may slip.

**Exercises and Physical Therapy*:*** There is a risk of developing stiffness and weakness of the affected limb throughout the lengthening process. It is very important to do exercises at home and regularly attend the physical therapy sessions as prescribed.

- Position the limb to encourage a gentle stretch. For example, it would be better to place a pillow under the foot instead of the knee to allow the leg to stay straight and not develop any flexion contractures.
- If any resting splints are provided, please use them as instructed.
- Dynamic stretching braces are sometimes ordered prior to surgery and customized for the individual patient's needs.

**Diet:** It is also important to maintain a healthy balanced diet. Taking supplemental Vitamin D can also help the bone heal faster.

**Nail removal**: Traditionally, we recommend nail removal 9–12 months after implantation and complete maturation of the lengthened bone. Removal procedures are typically performed in a same day outpatient setting and do not require an overnight hospital stay.

**Recovery**: When there are no further treatment plans, the patient is typically permitted to be weightbearing as tolerated in the immediate postoperative period but may require crutches for support for a few days after removal of the lengthening nail. They should typically avoid strenuous activities or contact sports for at least 6 weeks and closely follow instructions that are provided by the treating surgeon

***Contact Information:***

If you have a question or concern about your child, please call us:

- Weekdays (8 am - 4:30 pm): 510-428-3238 and ask to speak to your surgeon's nurse
- After 4:30 pm or Weekend/Holiday: 510-428-3000 (main hospital number) and ask to speak to the orthopedic resident on-call