

PRECICE[®] internal lengthening nail

Maureen Maciel, MD, Pediatric Orthopedic Surgeon

1. How long have we been using the PRECICE nail?
 - a. The PRECICE nail is a second-generation implantable limb lengthening device. It was released in 2011, and since improved upon. Surgeons have used other technologies for internal limb lengthening with varied success. With the release of PRECICE 2, more surgeons have adopted this practice for appropriate patients.
2. How do they work?
 - a. The PRECICE nail has a magnet inside of it. This magnet interacts with a magnet in the External Remote Controller (ERC), which a patient or parent holds next to the skin during a lengthening session. The communication between the two magnets causes the nail to lengthen in very tiny amounts. Usually, only 1/6-1/3 of a millimeter each session for a *maximum* of 1mm per day, depending on what your surgeon instructs. The ERC will be programmed according to your surgeon's instructions so that the nail cannot be lengthened more than your surgeon prescribes.
3. Are there any side effects?
 - a. Most "side effects" so to speak are not different than those of other traditional external lengthening devices. This is still a bone lengthening process, which requires new bone to form, and requires the muscles, nerves, and blood vessels to stretch as the bone gets longer. The big difference between internal and external lengthening is that with internal lengthening there are no pins or wires sticking out of the patient's skin. Since there is no communication from the skin to the deep tissue and the bone, the patients do not get skin infections from the pins. Also, the muscles do not have to stretch around the pins, so the patients have an easier time with therapy and maintain their range of motion more easily during the lengthening process.
 - b. The nail should be removed approximately one year after the patient has healed from their surgery and lengthening. The patient can go home the same day as removal surgery. The patient will be instructed on how much weight they can put on the leg. They should not participate in contact sports or high impact activities until cleared by their surgeon. The typical healing process is 4 weeks.
4. What precautions does the patient need to take during treatment?
 - a. The patient cannot bear full weight on their leg during the lengthening process and until the newly lengthened bone has healed. Your doctor will take x-rays during the process to ensure that the bone is lengthening and healing properly. When the bone has healed sufficiently, your doctor will tell you how much weight you can put on your leg. Typically, that will start with partial weight and then advance to full weight bearing over time.
 - b. If the patient needs a non-emergent MRI, their doctor should be consulted PRIOR to having the MRI. There is a magnet inside the PRECICE nail that could be damaged by high energy MRI's.

5. How is this different than Ilizarov (ring fixator) or other external lengthening devices?
 - a. Since the patient does not have an external device with pins and wires going into the bone, they can move around more easily and participate in more activities while undergoing the lengthening and healing process. Patients with external fixators often need special wheelchairs to accommodate the bulky device, and they cannot participate in any activities that might result in contamination of their pin sites (swimming in the ocean or in lakes, walking in areas with a lot of dirt and dust). *The most important thing to remember is that though the device cannot be seen on the outside, the lengthening process is still very complex, and the patient must be compliant with activity restrictions, physical therapy instructions, and follow up doctor's visits to ensure a successful outcome.*
 - b. Patient selection is very important. The smallest nail is 8mm in diameter because it must house the magnet and the lengthening device inside of it. Because it is implanted down inside the canal of the bone (femur or tibia) it can only be used in patients who are big enough for it to fit. Also, in order to put a nail down the inside of the bone, it has to go through at least one growth plate to access the canal. For these reasons, it cannot be used for most pediatric patients, particularly ones who are still growing through their open growth plates. Once the growth plates close (14 years in girls and 16 years in boys, on average) then the nail can be implanted safely. The femoral nails can be implanted at an age of approximately 9–11-year-olds because it does not go through a large growth plate.