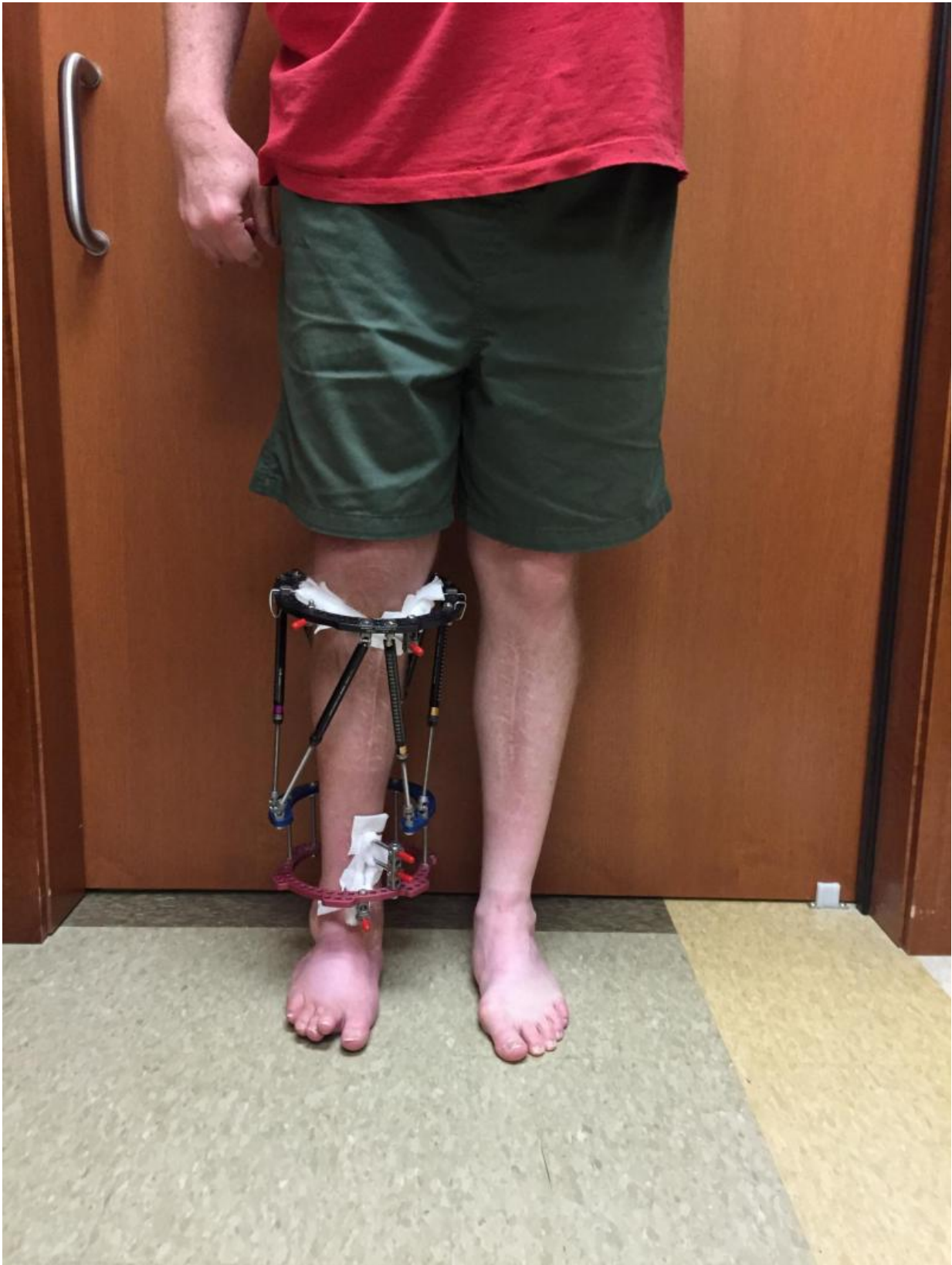


# **New limb-lengthening technique is less cumbersome for patients, study finds**

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This is the circular external fixator used in the standard limb-lengthening procedure. Credit: Loyola University Medical Center

A highly specialized procedure that lengthens bones can prevent the need for amputations in selected patients who have suffered severe fractures.

And now a new study has found that an alternative limb-lengthening technique makes the long recovery process less cumbersome—while still providing good-to-excellent outcomes. Loyola University Medical Center orthopaedic surgeon Mitchell Bernstein, MD, is first author of the study, published in the journal *Clinical Orthopaedics and Related Research*. Senior author is Robert Rozbruch, MD, of the Hospital for Special Surgery in New York.

The standard limb-lengthening technique requires patients to be fitted with a device called a circular external fixator. The device consists of a rigid frame made of stainless steel and high-grade aluminum. Three rings surround the lower leg and are secured to the [bone](#) in order to manipulate bone fragments with stainless-steel pins.

The study examined an alternative technique that employed an internal titanium rod in addition to the external fixator. Researchers compared the standard technique with this alternative technique in [trauma patients](#) who underwent lengthening of the tibia (shinbone). The alternative technique significantly reduced the amount of time patients had to spend in the external fixator (from 11 months to seven months).



This is an implanted titanium rod used in the alternative limb-lengthening procedure. Credit: Loyola University Medical Center

Preventing amputation is known as limb salvage. A prerequisite for salvaging an arm or a leg is the ability to regenerate missing bone.

Limb lengthening is used to replace missing bone or to lengthen or straighten deformed bones. Patients include children born with birth

defects and patients who have suffered severe fractures or bone cancer. In trauma patients, broken bones can become infected, requiring surgeons to remove the infected segment. In bone cancer patients, the surgeon takes out a segment of bone in order to remove the tumor. The limb-lengthening technique enables the patient to grow back the section of bone lost to infection or tumor.

Limb lengthening works on a principle known as distraction osteogenesis. Four times a day, the external fixator pulls apart two bone segments, and new bone tissue fills in the gap. As a result, the bone lengthens at a rate of about 1 mm. per day. Bones can be lengthened by between 15 percent and 25 percent of their original length at a time.

Once the new bone tissue is formed, it takes several more months until it fully regenerates. In the standard limb-lengthening technique, the patient wears the external fixator until the bone completely matures, in order to support the weight of the limb. In the alternative technique, the surgeon implants a titanium rod inside the bone, in order to reduce the amount of time the patient must spend in the external fixator.

The study was conducted at the Hospital for Special Surgery, where Dr. Bernstein completed a fellowship in limb lengthening and complex reconstruction. The study included 58 trauma patients who underwent limb lengthening. Thirty patients were treated with the standard technique. Twenty-eight patients were treated with the alternative technique, which combined the external fixator with the titanium rod implantation. In both groups, the average limb lengthening was 2.1 in.

There was no statistically significant difference in the severity or number of complications between both groups, and good-to-excellent results were found in all patients.

Wearing an external fixator can irritate the skin and cause infections at

the pin sites. Also, it's difficult to wear clothes over the device, and sleeping can be uncomfortable.

"As soon as we get patients out of the external frame they feel better," Dr. Bernstein said. "Limb deformity surgeons are trying their best to make it a bit easier for [patients](#), without compromising the safety of the procedure."

Provided by Loyola University Health System

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