LATN effective in lower extremity limb lengthening

By Mary Ann Petruzzelli

A new technique—lengthening and then nailing (LATN)—is effective in correcting leg length discrepancies (LLD) for a variety of conditions, according to the researchers for poster exhibit P459. In addition to addressing the deformity correction, the LATN technique also minimizes the time needed in external fixation.

In a study of 24 patients treated with LATN, LLD improved from 6.3 cm (range: 2.5 cm to 12.9 cm) to 1.0 cm (range: 0 cm to 5.5 cm). Full weight bearing was tolerated 7 weeks (range: 6 weeks to 11 weeks) after nailing and was considered the time of bony healing. Patients spent an average of 3.3 weeks (range: 3 weeks to 27 weeks) in an external fixation frame, resulting in an external fixation index (EFI) of just 0.5 mm/cm (range: 0.3 mm/cm to 0.7 mm/cm). In comparison, the classic Ilizarov method often requires an EFI of 1.5 mm/cm to 2 mm/cm in adults.

The LATN technique uses monolateral frames (such as the Ilizarov/Taylor Spatial or EBI fracture) for the distraction phase. Pins and wires are placed to allow subsequent intramedullary nailing. At the end of the distraction phase, removed large-diameter, long pins are replaced with a 1/4 inch diameter pin and the LATN frame is applied for lengthening.

Advantages of LATN

Although alternatives such as lengthening over a nail (LCN) and using internal lengthening nails exist, they have limitations, many of which are addressed by the LATN technique. Both LCN and LATN allow frame removal after the distraction phase of lengthening. However, potential advantages of the LATN technique include the following:

- The ability to insert a full length large diameter nail for more stability
- Elimination of concomitant use of internal and external fixators, thus lowering the risk of infection
- The ability to gradually correct diaphyseal deformity and lengthen prior to nail insertion, thus expanding the indications for use of this procedure
- Remaining through the regenerate, which appears to enhance and quicken the bony healing

Study results

Physicians used LATN to treat 24 patients with LLD (36 limbs; 33 tibiae and 3 femora). The patients had developed LLD due to a variety of causes: malunion (6), fibular dysplasia (2), rickets (2), polio (1), and congenital (13). In 12 patients, the procedure was used for stress lengthening.

For this retrospective, IRB-approved study of consecutive patients treated by a single surgeon, researchers recorded both clinical and radiographic data and compared the results with historical controls.

The average patient age was 35 years old (range: 22 years to 55 years old). The average follow-up was 36 months (range: 7 months to 64 months). LATN was successful in lengthening the legs an average of 5.7 cm (range: 2.5 cm to 10 cm), reducing LLD from an average of 6.3 cm to an average of 1.0 cm.

In addition to the reduced time in frame, researchers also noted the following:

- The delay between the end of distraction and nailing averaged 9.8 days (range 0 days to 35 days)
- Patients could tolerate full weight bearing an average of 7 weeks (range: 6 weeks to 11 weeks) after nailing. This was considered the time of bony healing
- The bone healing index averaged 0.8 months/cm (range: 0.4 months/cm to 1.2 months/cm)
- Ankle and knee range of motion (ROM) did not change with treatment.

One patient with spinal deformity developed temporary bilateral sciatic nerve palsy, but this was eventually resolved. There were no nonunions, fractures or loss of position.

Several additional procedures were performed, including 14 gastrocnemius releases, 9 intramedullary nail removals, 4 ankle fusions, 1 gradual correction of a knee contracture and 1 gradual correction of ankle contracture.

Based on this study, LATN seems to be a safe and effective procedure for limb lengthening and deformity correction, and researchers conclude that further study of LATN is warranted. The lead researcher is S. Robert Rozbruch, MD, of New York City.

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