International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 12 December 2025
DOI: 10.47191/ijcsrr/V8-i12-03, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

Right Femoral Lengthening: A Case Report

Juan Salas Fuentelzas[1], Raúl Silva Villagran[2], Manuel Reyes Guerra[2], María Josefina Galaz Soto[3]
[1]Orthopedic Surgeon, Instituto Traumatológico Dr. Teodoro Gebauer
[2]Medical Intern, Universidad de Chile
[3]Medical Student Universidad de Chile

ABSTRACT: We present the case report of a 34-year-old female patient with a history of epilepsy, presenting with a 10-cm congenital shortening and varus deformity of the right femur, in addition to a 1-cm tibial shortening resulting from a previous open fracture during adolescence. Surgical correction was performed using diaphyseal osteotomy and bone lengthening with a monoplanar external fixator (Orthofix). Following a 6-day latency period, progressive distraction was initiated at a rate of 0.75 mm/day. A total femoral lengthening of 9 cm and axis correction were achieved over 4 months. The consolidation phase lasted 9 months. Complications included superficial pin-tract infection and knee stiffness, both successfully managed with medical treatment and physical therapy. The fixator was removed after 14 months of evolution. Upon discharge, the patient achieved stable functional recovery without significant claudication.

KEYWORDS: Bone regeneration, Distraction osteogenesis, External fixator, Femoral osteotomy, Lower extremity length discrepancy.

I. INTRODUCTION

Lower limb length discrepancy is a common orthopedic condition that can significantly alter gait biomechanics, leading to functional impairment and long-term complications such as pelvic obliquity, scoliosis, and osteoarthritis of the hip and knee joints.[1] While minor discrepancies of less than 2 cm are often managed conservatively or with shoe lifts, significant shortenings, particularly those exceeding 5 cm, require surgical intervention to restore symmetry and function.[2]

Distraction osteogenesis, based on the tension-stress principle described by Ilizarov, remains the gold standard for limb lengthening and deformity correction.[3] This biological process allows for the formation of new bone tissue within an osteotomy gap through gradual mechanical distraction. Among the various devices available, monolateral external fixators offer a versatile and relatively well-tolerated solution for femoral lengthening, facilitating hygiene and patient mobility compared to circular frames.[4] This case report describes the management of a 34-year-old female patient with a severe congenital femoral shortening of 10 cm and varus deformity, treated successfully with a monolateral external fixator.

II. CASE PRESENTATION

A 34-year-old female patient with a medical history of epilepsy presented with a 10-cm congenital shortening and varus deformity of the right femur. She also had a history of an open fracture of the right lower leg during childhood, resulting in an additional 1-cm tibial shortening. Physical examination confirmed the 10-cm femoral shortening with varus angulation (Figure 1) and preserved range of motion in the right hip and knee. No other significant abnormalities were found in the general or segmental physical examination. Radiographic assessment confirmed the diagnosis, and surgical correction was indicated.

The patient underwent a diaphyseal osteotomy in the middle third of the femur and the application of a monoplanar external fixator (Orthofix) secured with eight Schanz pins, four proximal and four distal (Figure 2). The procedure was performed under regional anesthesia and femoral block without intraoperative incidents. The patient was discharged three days later with instructions for outpatient monitoring, analgesia, and assisted ambulation with two crutches.

Postoperatively, a latency phase of six days was observed, followed by a progressive distraction phase performed by the patient at a daily rate of 0.75 mm (Figure 3). Periodic radiographic and physical therapy controls were maintained, achieving 9 cm of lengthening and varus correction over four months. The consolidation phase lasted nine months (Figure 4). During this period, the patient developed moderate knee stiffness, which was managed by intensifying the physical therapy regimen, and a superficial

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 12 December 2025
DOI: 10.47191/ijcsrr/V8-i12-03, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

infection at the pin insertion sites, which resolved with local care and oral antibiotics. Radiographic controls demonstrated satisfactory callus consolidation, allowing for the removal of the external fixator after 14 months of evolution (Figure 5). At the two-month follow-up after removal, radiographs showed complete consolidation and adequate alignment. The patient achieved functional recovery with a stable gait and no incapacitating pain (Figure 6).

Figure 1: Preoperative radiograph of the right femur.

Figure 2: Postoperative control with external fixator.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 12 December 2025
DOI: 10.47191/ijcsrr/V8-i12-03, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

Figure 3: Radiographic control during distraction phase.

Figure 4: Consolidation phase and regenerate formation.

Figure 5: Radiograph after fixator removal.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 12 December 2025
DOI: 10.47191/ijcsrr/V8-i12-03, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

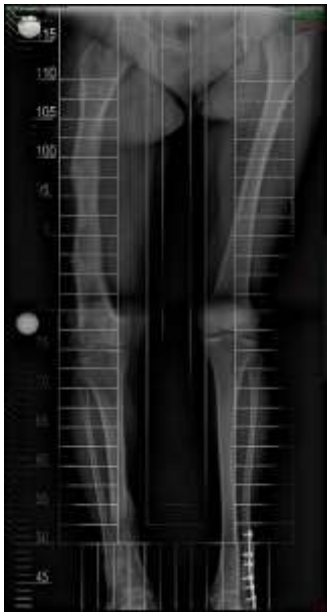

Figure 6: Final follow-up showing restored length.

III. DISCUSSION

External fixators are associated with a high frequency of superficial pin-tract infections; however, they remain highly versatile and capable of correcting virtually any multiplanar deformity. The stability of an external fixator frame is directly related to the number of planes stabilized, the number of fixation points, the material strength, and the distance between the rod and the bone.

In contrast, internal lengthening devices, such as motorized intramedullary nails, function through an external stimulus applied by the patient, such as a magnetic field. These devices are generally restricted to large tubular bones like the femur and tibia and typically allow for a maximum distraction of approximately 8 cm, which is a limitation compared to the theoretically unlimited capacity of external fixation. Furthermore, their ability to correct complex deformities is more restricted. Nevertheless, internal devices offer significant advantages, including lower complication rates, improved patient tolerance, and reduced postoperative pain while maintaining comparable final outcomes.[5]

IV. CONCLUSION

Limb lengthening techniques, which demand a profound understanding of bone biology, remodeling, and soft tissue adaptation, have witnessed significant technological advancements over the last two decades. Consequently, it remains a relatively young subspecialty within orthopedics and traumatology, both in Chile and internationally.[6] Despite its transformative potential, this field is often underrecognized among the general population and other medical specialties. The successful management of this case illustrates the efficacy of external fixation for severe congenital discrepancies, emphasizing the importance of precise surgical planning and rigorous postoperative monitoring.

CONFLICT OF INTEREST The authors declare no conflict of interest regarding the publication of this case report. No external funding was received for this work.

REFERENCES

1. Guichet JM, Spivak JM, Trouilloud P, Gramm PM. Lower limb length discrepancy: An epidemiologic study. *Clin Orthop Relat Res*, 272, 1991, pp. 235-241.
2. Gross RH. Leg length discrepancy: how much is too much? *Orthopedics*, 1(4), 1978, pp. 307-310.
3. Rozbruch SR, Ilizarov S. The Ilizarov Method: History and scope. In: *Limb Lengthening and Reconstruction Surgery*. Informa Healthcare, 2007, pp. 1-18.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 12 December 2025
DOI: 10.47191/ijcsrr/V8-i12-03, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

4. Manner HM, Huebl M, Radler C, Ganger R, Petje G, Grill F. Accuracy of complex lower limb deformity correction with external fixation: a comparison of the Taylor Spatial Frame with the Ilizarov ring fixator. *J Child Orthop*, 1(1), 2007, pp. 55-61.
5. Guichet JM, Casar RS. Mechanical characterization of a totally intramedullary gradual elongation nail. *Clin Orthop Relat Res*, 337, 1997, pp. 281-290.
6. Revista Chilena de Ortopedia y Traumatología. Volume 56, Issue 2, May-August 2015, pp. 18-25. https://doi.org/10.1016/j.rchot.2015.09.005.

Cite this Article: Fuentelzas, J.S., Villagran, R.S., Guerra, M.R., Galaz Soto, M.J. (2025). Right Femoral Lengthening: A Case Report. International Journal of Current Science Research and Review, 8(12), pp. 5899-5903. DOI: https://doi.org/10.47191/ijcsrr/V8-i12-03