

# Multi-stage correction of shortening and deformities of the lower leg in children and adolescents with an external fixation device according to ilizarov

## Abstract

Ilizarov Technique is a fantastic tool for correcting Shortening and deformities of the lower leg in children and Adolescents. The principle of compression-distraction histogenesis of bone and soft tissue is the basis of treatment of the Ilizarov ring fixator. Distraction histogenesis generates new bone and soft tissue under gradual distraction. All my research was carried out at Bari-Ilizarov Orthopaedic Centre from Jan 2013 to Dec 2022.

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## Introduction

Deformities of limbs may be congenital and can become apparent in early childhood. The concerned bones are the femur, tibia, fibula, radius ulna and humerus. The bones of the head and foot may be involved too.<sup>1,2</sup>

### Types of deformities of lower limb

Lower Limb Deformities may be:

Non-unions

Genu Varum

Genu Valgum

Limb Length Discrepancy

Procurvatum

Recurvatum

### Patient criteria

Children to adolescents- age ranged from 3yrs. to 17 years.<sup>3</sup>

LLD of lower limb (femur/tibia) with

Osteomyelitis

Non-unions

Pathological fractures

Number of patients: 34

12 females, 22 males

### Limb lengthening

By small incision the bone is cut, and Ilizarov device is applied on limb.

The devices gradually pulled; apart the fragments from each

other leading to new bone (callus) formation. [LAW OF TENSION STRESS]<sup>4</sup>

Bone and soft tissues can grow under mechanical tension which is very close to natural growth.

Corticotomy is a

Low energy Osteotomy with the preservation of-

Periosteum

Endosteum

Bone Marrow

Ilizarov classical corticotomy.....all wires frame

### Treatment options

By Ilizarov

### Biological parameters

0.25mmX4times a day 0.125mmX8 times aday

60 times a day by automatic distractor<sup>5</sup>

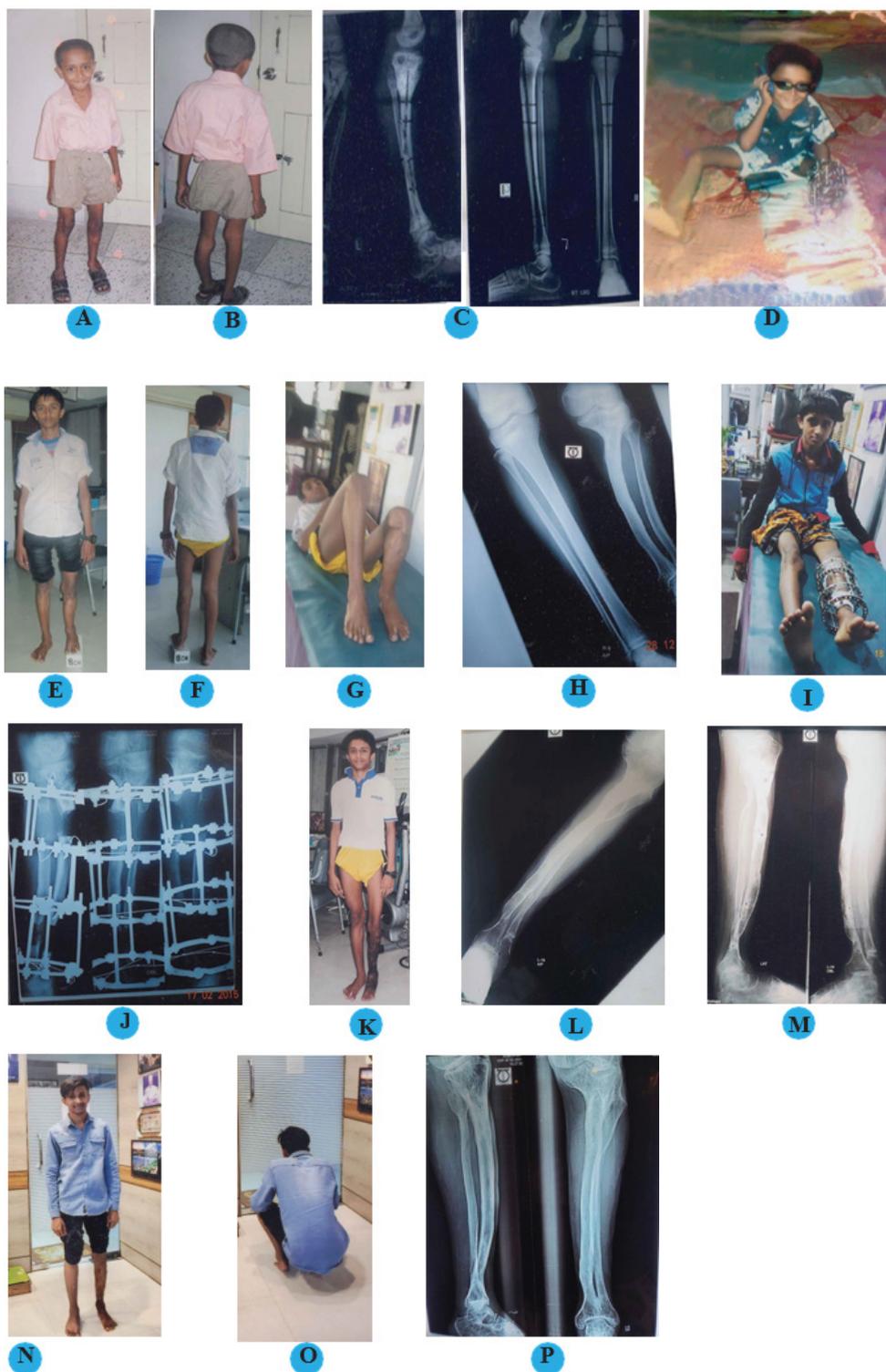
## Results

From January 2013 to December 2022, 34 patients with shortening and Deformities of The Lower Leg were treated by Ilizarov. The average time of treatment was 6 months (range 4-12 months). Osteogenesis and tissue genesis of the distraction gap was achieved in all the 34 patients. There were no incidents of neurovascular complications.

## Conclusion

Ilizarov technique is a promising method that can be used for correcting deformities of the limbs. It can be applied at multiple levels of the affected limb. Sometimes, two or three steps surgery is required.

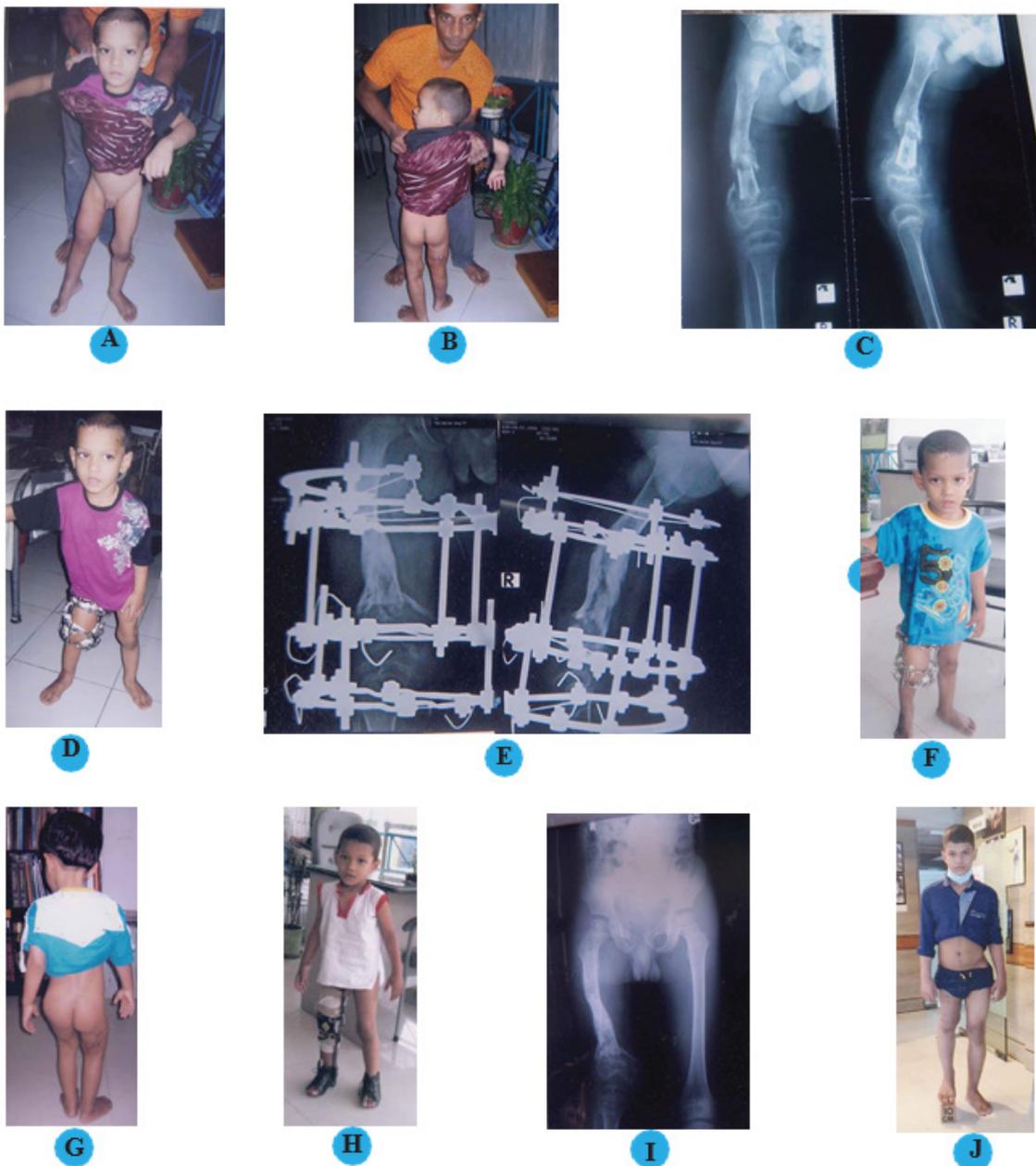
Case 1:

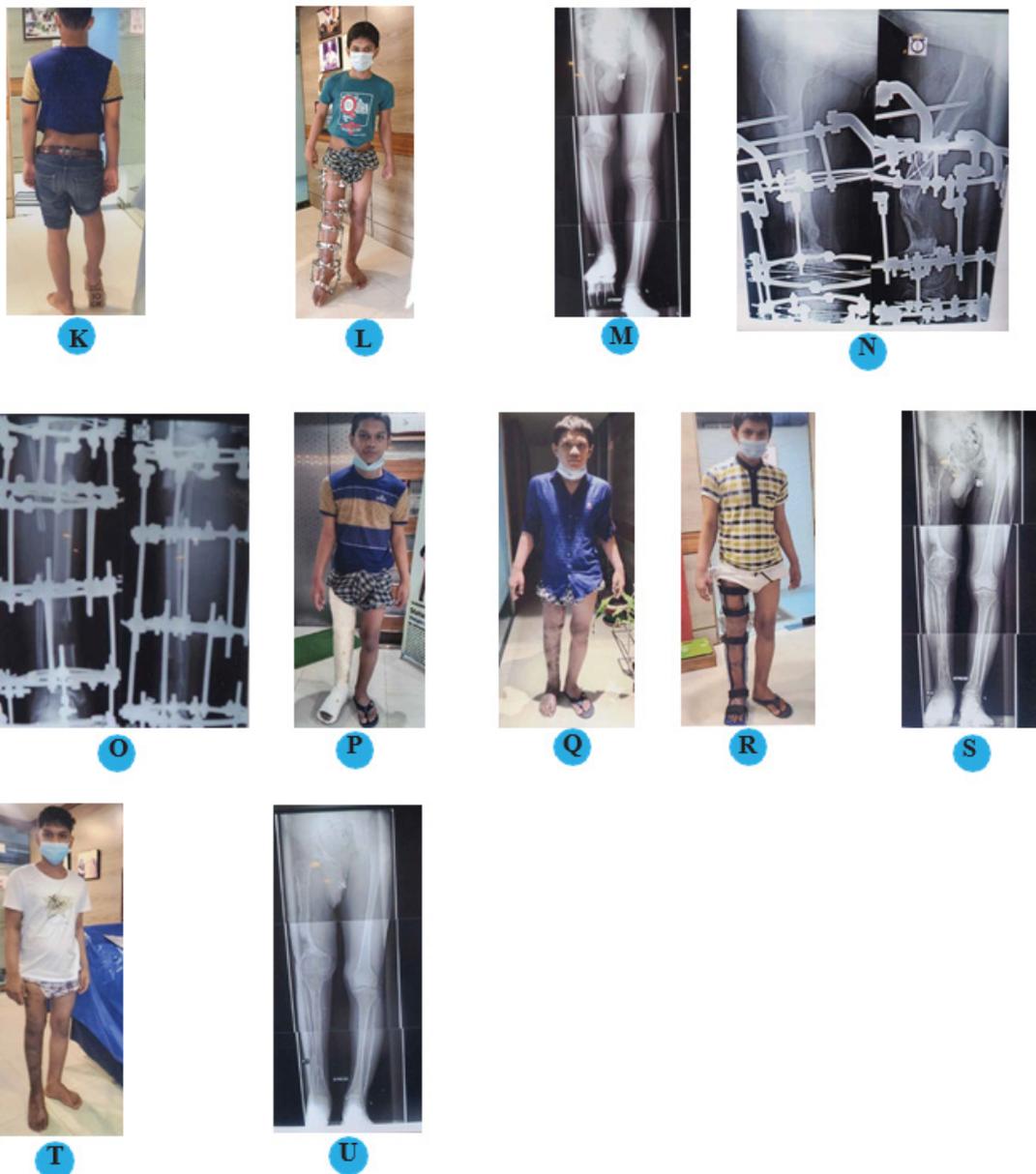


- i. 5 years old boy é 4cm LLD Lt tibia/fibula é varum deformity. (Front view)
- ii. 5 years old boy é 4cm LLD Lt tibia/fibula é varum deformity. (Back view)
- iii. X-ray showing Cora and LLD
- iv. Patient with Ilizarov apparatus
- v. 8 cm LLD at age 11 (Front view)
- vi. 8 cm LLD at age 11 (Back view)

- vii. LLD visible in lying position
- viii. X-ray showing LLD of left tibia/fibula by 8 cm
- ix. Patient with Ilizarov apparatus
- x. X-ray showing lengthening of both upper and lower tibia/fibula
- xi. After full correction (Frontview)
- xii. AP view of left tibia/fibula after full correction
- xiii. Lateral view
- xiv. Final follow up at the age of 17 (12 years follow up)
- xv. Back view with full knee flexion
- xvi. Final follow-up of x-ray.

**Case 2:**





- i. Chronic osteomyelitis é pathological fracture Rt femur of 4 years old boy é discharging sinus (Front view)
- ii. Chronic osteomyelitis é pathological fracture Rt femur of 4 years old boy é discharging sinus (Back view)
- iii. Pathological fracture Rt femur (X-ray)
- iv. Patient with Ilizarov apparatus
- v. X-ray showing union of femoral shaft
- vi. Weight bearing with Ilizarov frame
- vii. After Removal of frame (Back view)
- viii. Front view after removal
- ix. X-ray of Rt femoral with 12.5cm LLD at age 13
- x. 12.5 cm LLD (Front view)
- xi. 12.5 cm LLD (Back view)
- xii. After application of Ilizarov in both femur and tibia/fibula

- xiii. Stress X-ray showing 12.5 cm LLD Rt femur
- xiv. X-ray of Rt hip to knee showing lengthening of femur
- xv. X-ray of Rt tibia/fibula showing lengthening going on
- xvi. After removal of frame and application of full plaster
- xvii. After removal of plaster
- xviii. Application of brace for support
- xix. Stress x-ray showing full correction of LLD
- xx. Final follow up at age 14 after 11 months of treatment
- xxi. Stress X-ray showing full correction

## References

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