

Original Research Article

Complex foot deformity and Ilizarov technique: a record-based study

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ABSTRACT

Background: Complex foot deformities may occur as a result of trauma, poliomyelitis, osteomyelitis, burn contractures, neuromuscular diseases or may present as a resistant congenital contracture such as clubfoot. The Ilizarov fixator is new and more efficient method in the treatment of orthopedic foot problems. The aim of the study was to assess the outcome of Ilizarov technique.

Methods: This is a hospital record-based study conducted in 32 patients of foot deformity at orthopedic ward of Navodaya Medical college and Hospital, Raichur. The record-based data was collected in January to July 2019. Data analysis done with SPSS 24.0 version IBM USA.

Results: Majority of the subjects were from 0 to 5 years age group i.e. 14 (43.8%). Mean age was 26.2±4.9 years. Majority in our study were males i.e. 71.9%. In majority of the cases, the cause of foot deformity was neglected and relapsed club foot i.e. 12 (37.5%). Treatment period was 22±7 weeks.

Conclusions: The Ilizarov method can successfully correct complex foot deformities. Success rate was 90.6%.

Keywords: Foot deformity, Ilizarov technique, Ilizarov fixator

INTRODUCTION

Complex foot deformity can be defined as a multiplanar deformity which that present with foot shortening. The deformity may be accompanied by other chronic problems such as poor soft tissue coverage due to recurring or neglected cases, leg length discrepancies, lower leg deformities, osteomyelitis, and nonunion. Such deformities may occur as a result of trauma, poliomyelitis, osteomyelitis, burn contractures, neuromuscular diseases or may present as a resistant congenital contracture such as clubfoot.^{1,2} There are several modern treatment techniques for management of relapsing and neglected deformities. Problems are common for persistent deformities and defective cases.¹⁻⁶ Abnormally tight ligaments and tendons hinder further growth and result in complicated deformities.⁷⁻¹³ The Ilizarov fixator is new and more

efficient method in the treatment of orthopedic foot problems. It is capable of altering the form and dimensions of the bones through proper application of loads (compression and distraction) on various parts of the foot. It may also correct the components of the deformities by combining a number of functional units (uniplanar or multiplanar hinges and traction equipment), enabling the treatment of infantile, adolescent and adult patient deformities.¹⁴

The study was done with the aim to assess the outcome of Ilizarov technique.

METHODS

This is a hospital record-based study conducted in 32 patients of foot deformity at orthopedic ward of Navodaya

Medical college and Hospital, Raichur. The record-based data was collected in January to July 2019. All cases during last 8 years were studied from the record section. All patients received preoperative evaluation of both lower extremities. This evaluation consisted of range-of-motion measurements, neurovascular assessment, standing footprints, two plane and posterior tangential radiographs, computed tomography (CT) and 3D reconstruction, photography, and doppler ultrasonography.

Inclusion criteria

Patients having nonunion with no signs of clinical, radiological and biomechanical evidence of infection were included in the study.

Exclusion criteria

Patients with history of other injuries, those aged above 50 or under 13, and those suffering from rheumatoid arthritis, diabetic mellitus, and fracture in the other limb were all excluded from the study.

Statistical analysis

The data analysis was carried out in SPSS 24.0 version and presented in the form of percentages.

RESULTS

We included 32 patients in our study. Majority of the subjects were from 0 to 5 years age group i.e. 14 (43.8%). This is followed by 11 patients i.e. 34.4% from 6 to 18 years age group and least were from above 18 years age i.e. 21.9% (Table 1). Majority in our study were males i.e. 71.9% whereas 28.1% were females (Figure 1).

Table 1: Distribution according to age group.

| Age of presentation (years) | Number of patients | Percentage |
|-----------------------------|--------------------|--------------|
| 0 to 5 | 14 | 43.8 |
| 6 to 18 | 11 | 34.4 |
| >18 | 7 | 21.9 |
| Total | 32 | 100.0 |

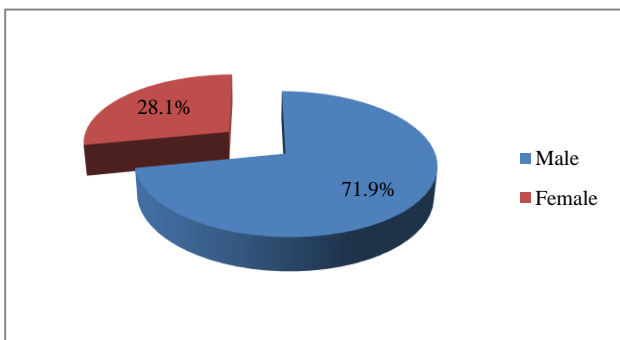


Figure 1: Distribution according to gender.

Table 2: Distribution according to etiology.

| Etiology of foot deformity | Number of patients | Percentage |
|---|--------------------|--------------|
| Neglected and relapsed club foot | 12 | 37.5 |
| Poliomyelitis | 4 | 12.5 |
| Trauma | 11 | 34.4 |
| Burn contracture | 5 | 15.6 |
| Total | 32 | 100.0 |

Table 3: Distribution according to foot deformity.

| Procedure of foot deformity | Number of patients | Percentage |
|-----------------------------|--------------------|--------------|
| U method | 5 | 15.6 |
| V method | 6 | 18.8 |
| Supra malleolar | 12 | 37.5 |
| Mid foot | 9 | 28.1 |
| Total | 32 | 100.0 |

Table 4: Outcome of the procedure.

| Variables | Number of patients | Percentage | |
|---------------------------------|--------------------|------------|--------------|
| Outcome of the procedure | Satisfactory | 29 | 90.6 |
| | Non satisfactory | 3 | 9.4 |
| | Total | 32 | 100.0 |



Figure 2: Preoperative.

In majority of the cases, the cause of foot deformity was neglected and relapsed club foot i.e. 12 (37.5%). In 11 patients i.e. 34.4%, the cause was trauma. In 5 (15.6%) the cause was burns and in 4 (12.5%) was poliomyelitis (Table 2).

In 12 patients (37.5%) supra-malleolar osteotomy was done. In 9 i.e. 28.1% midfoot osteotomy was conducted (Table 3). Success rate of the procedure was 90.6% (Table 4).



Figure 3: Ilizarov technique.



Figure 4: Post-operative.

DISCUSSION

The Ilizarov external fixator is suitable for the management of the correction and fixation of foot deformities by its very three-dimensional nature. The Ilizarov method permits the stepwise correction of all components of deformities without further shortening of osseous structures of the foot. The adaptation of bones and soft tissues to these mechanical forces are indeed striking. Ilizarov explains this with his tension-stress method built from his basic and clinical studies.^{1,9,10,12,15,16} The process leading to the biological plasticity is the stepwise correction.

The goals of foot deformity treatment should be the attainment of foot that is normal in size, pain free, plantigrade, and functional.¹⁷ There are two ways in which foot deformities can be corrected using the Ilizarov method: with and without osteotomy.^{18,19} In the non-osteotomy method, deformities are corrected through joints rather than the bone substance. Soft-tissue distraction treatment is recommended for patients who have a congruous joint with no significant fixed bony deformities and for children younger than 8 years of age.²⁰⁻²²

Incidence of deformity recurrence in our cases is lower than the reported literature. We observed only one case of

deformity recurrence. This lower incidence of deformity recurrence in our cases is most likely related to following the principles regarding the use of osteotomy.

CONCLUSION

This method is particularly advantageous in treating complex foot deformities. The Ilizarov method can successfully correct complex foot deformities. Rate of success was 90.6%.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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