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Experience With Ilizarov Techniques

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SUMMARY

We present a series of forty patients with limb deforties non-union and segmental defects. These were managed with various Ilizarov techniques. The components of fixators were developed locally. The patients were followed upto three years. Excellent to good results were achieved in sixty percent, fair in twenty five percent and poor results in fifteen percent. Ilizarov methods are useful in difficult orthopaedic problems under our circumstances

INTRODUCTION

The discoveries of Ilizarov constitute one of the most remarkable advances in the history of musculoskeletal research[1]. The concept of transossous osteosysnthesis has provided severel new techniques for reconstruction of deformed and shortended extremities. It has come up with new hopes for patients with chronic osteomyelitis and segmental defects. Chronic infection of the diaphyseal shaft of long bones is one of the most perplexing dilemmas in orthopaedic surgery. To obtain eradication of the infection, bony union, and a functional extremity often requires courageous measures with increasing risk of failure or amputation[2]. Difficult or resistant infections usually require a more redical debridement of the septic bone and soft tissues in addition to application of stable fixation to enhance soft tissue healing and bony union[3].

We are using various techniques of Ilizarov since Aug. 1993 at our unit. The various components of Ilizarov fixator are manufactured locally. In this article, we describe early results of our experience at Sheikh Zayed Hospital, Lahore.

MATERIAL AND METHODS

From Augest 1993 to June 1996, we used various Ilizarov techniques on forty patients. Thirty were males and ten females. The minimum age was 04 years and maximum 72 years with mean age of 32 years. The indications for surgery are given in Table 1.

The beakdown of nine patients with limb deformities is given in Table 2.

Twenty two patients had non-union of various bones. The detail is given in Table 3.

Table 1: Indications for surgery.

Limb deformities	11
Non-union	22
Open/segmental fractures tibia and fibula	07
Total patients	40

Table 2: Limb deformities

Congenital Pseudarthrosis of tibia	2
Angular deformity distal radius	1
Post Rickets genu varum	2
Malunited fracture shaft of femur	3
Congenital Talipes Equinovarus	2
Post septic arthritis ankylosed knee	1
Total	11

Table 3: Non-union

Humerus	03
Radius	02
Tibia	15
Femur	02
Total	22

Out of twenty two patients with non-union, sixteen had persistent infection and six were without infection. Fifteen patients had segmental defects. Minimum was two centimeter and maximum fifteen centimeters with mean of six centimeters.

Two types of external fixators were used in this study. In twenty five patients Ilizarov external fixators with circular frame and k-wires were used. In fifteen patients, A.O. external fixators with threaded rod (Ilizarov attachment) were used. Both of these fixators were manufactured locally.

Various Ilizarov procedures were used in this study. Their detail is summerised in Table 4.

Table 4: Procedures.

Osteotomy	21
Correction of angular deformity	08
Distraction osteogenesis	06
Compression osteogenesis	07
Compression distraction osteogenesis	04
Stabilization	03
Segmental transport	25
Total	74

The evaluation of results was performed using criteria laid described by Cattaneo et al 1992. In this technique, union, infection and function is evaluated, the results are divided into excellent, good, fair and poor.

The follow-up ranged from six months to thirty six months, with mean of twenty four months. Out of forty patients, thirty two have completed or nearly completed their treatment.

We were able to achieve excellent to good results in sixty per cent (Table 5) and fair in twenth five per cent. However, the results were poor in fifteen per cent

Table 5:

Results	*No.*	*%*
Excellent/good	24	60
Fair	10	25
Poor	06	15

Number of complications occured duing this study are given in Table 6. Most of these complications were minor and were managed with out much difficulty. Few complications required a second procedure.

Table 6 Complications.

Pin tract infection	12
Pin/wire loosening	08
Early consolidation	03
Mal-union	02
Non-union	02
Refracture	02
Extension of osteotomy into pin tract	01
Sudeck's atrophy	01
Irritation of nerve	01
Wire/pin breakage	03
C-ring breakage	01
Total	**36**

DISCUSSION

The biomechanical properties inherent to small pin circular external fixator and techniques of internal bone transport are important inovations that will help surgeons to meet challanges of this difficult problem[4]. The Ilizarov frame construct is very resistant to torsion and bending forces but is adaptable to axial loading. It allows significantly more motion at the fracture site during axial compression than other available fixators. This is an common characteristic that isolate Ilizarov frame from other external fixators. The main advantages of Ilizarov external fixator are (1) functional weight bearing properties of the frame during treatment; (2) progressive correction of angulatory and tortional deformaties; and (3) ability to apply compresion, distraction, and angulatory correction at multiple levels within a single frame construct.

The histological appearence of the regenerated bone that is seen after Ilizarov lengthening is similar to that of bone seen during the process of fracture healing or intramemranous bone formation. An inflammatory reaction develops after the osteotomy. When distration is performed, fibroblast appear and produce collagen along direction of distration. As the distraction continues, the collagen condences into bundles interposed with capillaries, and this

vascularization promotes osteoid production. With furthe distraction, the osteoid matures into lamellar bone, which in turn, remodels into cortical bone with an intramedullary canal[5].

Most of pin tract infections were mild and were managed with antibiotics and pin tract care with repeated dressings. In three patient we changed the K-wires. The early consolidations were managed by second osteotomy. in two patients with non-union at docking site, Ilizarov External fixator was applied and osteogenesis was induced by compresions and full weight bearing. Union was achieved without bone grafting.

We conclude that Ilizarov methods are more biological, less invasive. These are cost effective but take time to learn. These can be applied in least equipped operation theatres. Ilizarov methods are useful in difficult orthopaedic problems under our circumstances

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