9. CLINICAL MATERIAL

9.1. Materials and Methods

In Our Institution Sri Ramachandra Medical College and Research Institute between 1995 and 2001 about 103 cases of various orthopedic conditions were treated by Ilizarov Ring fixators. These study groups comprised of 97 male and 6 female patients between the ages of 13 to 73. (Chart 9.1, 9.2)

Chart 9.1 - Age Distribution
Chart 9.2 - Sex distribution

They included open intra articular fractures, comminuted fractures, segmental fractures, and infected nonunion which required segmental transportation, fibular transport, residual poliomyelitis which necessitated lengthening procedures, and deformity corrections. (Table 9.1) 75 cases of open fractures were followed up in postoperative period. The patients were followed up 6, 12, 16 weeks, by then till the fracture united. If the fracture union is delayed then they are followed up for every 6 weeks. Regularly they were followed up for 6 months to 2 years. 21 cases were followed up less than 4 months and they were considered lost from follow up, 27 cases were followed up for more than 6 months, 32 cases were followed up for more than 1 year, and 16 cases were followed up more than 2 years or more. Fractures of femur -7, deformity correction -2, lengthening -2 and 21 cases of fractures dropout were excluded.
Table 9.1 - Case distribution.

All the fractures were open fractures, which were classified anatomically by AO methodology and open wound by Gustillo – Anderson method. (Chart 9.3, 9.4) Proximal tibial plateau 14 cases, mid diaphysis 76 cases, distal diaphysis 2, and fractures involving the ankle joint 4.

By Gustilo classification Gr I comprised 22 cases, Gr. II 36 cases, Gr.IIIa 26 cases, Gr.III b 9 cases, and Gr III c 3 cases
Chart 9.3 - AO Classification.

Chart 9.4 - Gustilo Classification

Chart 9.5 - Ring construct
9.2. Observations

Out of 75 cases studied 52 cases went in for union with in 12-16 weeks, 9 cases 16-24 weeks, 10 cases 24-52 weeks, and more than 52 weeks 2 cases. (Chart 9.8) Only 2 went in for non-union and 3 delayed union at the end of 4 months and they dropped out, even though they could have been corrected.

Chart 9.6 - Healing time
9.3. Clinical Examples

Case – 1: 2 ring construct - 23 Year male Gr. III B
Case – 2: 2 ring construct - 40 Yr Male – Shattered, closed deglove injury
Case – 3: 3 ring construct - 50 Yr Male Schatzker VI
Case – 4: 3 rings construct: 13 Yr Boy Gr. II Tibia infective non union.
Case – 5: 4 ring construct - 26 Male Gr III a Tibia infective non union.
Case 6: 61 Female Ipsilateral femur and Tibia, Early removal, Varus deformity.

Preoperative

Postoperative

Ring Removal
12 weeks

After 20 Weeks
Case 7: 40 Yrs Male 1 1/2/ Infective Pseudarthrosis treated by compression and distraction that had bleeding problem.
Angiogram showing increased vasculature.
9.6. Results

When the patient had full functional recovery, it is classified as excellent, when they had a correctable complication then they were categorized as good, when they had sequelae of the injury and complications which were not correctable and limited functional activity then they were termed as poor, and if the condition worsened after the procedure then they were classified Bad.

In our series 97.3 % of the cases went in for fracture healing. The treatment time had been short with less secondary procedures and less morbidity since they were ambulated early. Out of 75 cases 46 had excellent outcome, 21 good and 6 fair, and 2 bad results. In Shved et al series 85% out of 36 patients had functional recovery [46]. In another study by Shaved et al, they claim the disability is reduced by 3-4 times when ring fixator is used and 95.3% had functional recovery [47]. According to Kallayev study on Juxta and intra articular fractures out of 149 patients treated by ring fixator, all of them returned to their original job [48]. In a study by Okulov out of 49 intra articular fractures all of them regained functionally useful range of movement and weight bearing [49]. Okhotsky et al in their study of ring fixators in open fractures, out of 124 cases healing occurred in 93.3 % of the cases and the risk of development of osteomyelitis was reduced from 22% to 6% [50].

![Chart 9.7 - Results](chart)

*AN HONEST AND INTELLIGENT PHYSICIAN, MUST ALWAYS ASK: AT WHAT PRICE-AND AT WHOSE EXPENSE- HAS SUCH SUCCESS BEEN ACHIEVED?* - Ilizarov.