

ORIGINAL RESEARCH

## Functional Outcomes Of Rail Road Fixator As A Primary Mode Of Fixation In Compound Tibia Fractures

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### ABSTRACT

**Background:** The present study was undertaken for assessing the functional outcomes of rail road fixator as a primary mode of fixation in compound tibia fractures.

**Materials & methods:** A total of 20 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. Thorough examination was done to rule out other systemic injury like head injury, cardiorespiratory and abdominal status. Patients with hypovolaemic shock were treated with IV fluids like plasma expanders, dextrose, normal saline, ringer lactate solution. In our series, compound middle one-third fracture both bones of leg were more common. Slightly common on right side than the left leg. Application of Rail external fixator was carried out in major OT after investigations. Follow-up was done and results were analyzed.

**Results:** The mean time of full weight bearing post operative was 6.3 days. 50 percent of the patients, time of fracture union was 24 weeks to 30 weeks, while in 40 percent of the patients; time to fracture union was 31 to 35 weeks. Mean time of fracture union was 32.3 weeks. In our study Overall complications were seen in 3 patients.

**Conclusion:** LRS is a simple and easy system which can be used for all open fractures. Fixation with LRS is a single definitive surgery. It is a cost-effective mode of treatment. Patient is independent and walks full weight bearing without walking aids.

**Key words:** Rail road fixator, Fixation, Tibia

### INTRODUCTION

Tibia being the most common fractured long bone with recorded incidence of 17–21 per 100000 population, represents 2% of all fracture and 36.7% of all long bone fractures in

adults. Epidemiological studies have shown that open fracture comprises 23.5% of all tibial shaft fracture. The common causes of fracture are road traffic accident(62.2%), falls(18.7%), sports(7.4%) and direct blows(8.3%). The lack of the muscular covering over anteromedial aspect of the tibia and poor blood supply predispose open tibial fractures to certain complications.<sup>1-3</sup> They present with a 10–20 fold increased risk of developing infection than open fracture in any other anatomical areas<sup>4</sup> and a nonunion rate as high as 28% has been reported in the literature.<sup>4, 5</sup> Administration of broad spectrum IV antibiotics, meticulous wound debridement, operative stabilization of the skeletal injury and early soft tissue coverage of the open wound are all part of the therapeutic protocol. Treatment options for tibial fractures vary according to the type of fracture, age group, bone density, soft tissue status and associated complications.<sup>5-8</sup> Hence; the present study was undertaken for assessing the functional outcomes of rail road fixator as a primary mode of fixation in compound tibia fractures.

## MATERIALS & METHODS

The present study was undertaken for assessing the functional outcomes of rail road fixator as a primary mode of fixation in compound tibia fractures. A total of 20 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. Thorough examination was done to rule out other systemic injury like head injury, cardiorespiratory and abdominal status. Patients with hypovolaemic shock were treated with IV fluids like plasma expanders, dextrose, normal saline, ringer lactate solution. Wound debridement was done under spinal anaesthesia, 5 to 6 litre of normal saline, betadine and hydrogen peroxide were used. Antiseptic solution irrigation for washing wound is used. For type II and type IIIA and IIIB fractures, thorough wound debridement was done and shifted to radiology department for X-ray evaluation. In our series, compound middle one-third fracture both bones of leg were more common. Slightly common on right side than the left leg. Application of Rail external fixator was carried out in major OT after investigations. Follow-up was done and results were analyzed.

## RESULTS

The present study was undertaken for assessing the functional outcomes of rail road fixator as a primary mode of fixation in compound tibia fractures. Mean age of the patients was 42 years. The 90 percent of the patients were males while the remaining 10 percent were females. The Mean duration of surgery was 52.17 minutes. In our study, Secondary procedures (Grafting) were done in 33.33 percent of the patients. The mean time of full weight bearing post operative was 6.3 days. 50 percent of the patients, time of fracture union was 24 weeks to 30 weeks, while in 40 percent of the patients; time to fracture union was 31 to 35 weeks. Mean time of fracture union was 32.3 weeks. In our study Overall complications were seen in 3 patients.

**Table 1: Secondary procedure done**

Secondary procedure done	Number of patients	Percentage
Grafting	6	30
Total	20	100

**Table 2: Time of full weight bearing post operative**

Parameter	Mean	SD
Time of full weight bearing (days)	6.3	1.3

**Table 3: Time of fracture union**

<b>Time of fracture union (weeks)</b>	<b>Number of patients</b>	<b>Percentage</b>
24 to 30 weeks	10	50
31 to 35	8	40
More than 35	2	10
Mean $\pm$ SD	32.3 $\pm$ 6.15	

**Table 4: Complications**

<b>Complications</b>	<b>Number of patients</b>	<b>Percentage</b>
Pin tract infection	1	5
Surgical site infection	1	5
Pin tract infection + Delayed union	1	5

**DISCUSSION**

The treatment of tibia bone loss can be challenging because of associated co-morbidities such as soft tissue problems, infection, deformities, adjacent joint contractures and socio-economic factors. The surgical options for the treatment of bone loss include bone transport, vascularized fibula graft, and induced membrane. Vascularized fibula graft has certain limitations like highly demanding surgical technique, risk of microvascular anastomosis failure, graft fracture; graft non-union and donor site morbidity. Bone transport with Ilizarov has become gold standard for the treatment of bone loss.<sup>7-10</sup> Hence; the present study was undertaken for assessing the functional outcomes of rail road fixator as a primary mode of fixation in compound tibia fractures.

Mean age of the patients was 42 years. The 90 percent of the patients were males while the remaining 10 percent were females. The Mean duration of surgery was 52.17 minutes. In our study, Secondary procedures (Grafting) were done in 33.33 percent of the patients. Singh AK et al studied the Functional outcome of performing distraction osteogenesis in cases of infected non-union of tibia treated with Ilizarov and Limb Reconstruction System. The study was done with 27 patients of infected gap nonunions of the tibia. After implant removal, if required radical resection of necrotic tissue and fractures were stabilised with Ilizarov or mono-lateral fixator depending on non-union site. Corticotomy was either done proximally or distally. Patients were followed up at monthly intervals for a minimum of 6 months. The ASAMI-Bone healing score was Excellent or Good in 86% patients, and Functional score was Excellent or Good in 89% of patients. The commonest problems were of pin tract infection, wire loosening and angulation of the transported segment. Elderly age, persistent infection, sensory loss in the foot, the stiffness of the knee, and above all the patient's reluctance to go any further given the protracted treatment besides, systemic disorders such as diabetes are all pointers for considering amputation as an alternative.<sup>8</sup> Hence; the present study was undertaken for assessing the functional outcomes of rail road fixator as a primary mode of fixation in compound tibia fractures.

The mean time of full weight bearing post operative was 6.3 days. 50 percent of the patients, time of fracture union was 24 weeks to 30 weeks, while in 40 percent of the patients; time to fracture union was 31 to 35 weeks. Mean time of fracture union was 32.3 weeks. In our study Overall complications were seen in 3 patients. Singh P et al analysed the efficacy, functional and radiological outcome of Limb Reconstruction System (LRS) in management of open fractures of tibia with or without bone loss as a primary and definitive tool. They treated 20 patients with compound injuries of tibia with Limb Reconstruction System (LRS) as a primary and definitive tool. 15 males & 05 females were included. Average follow up period

was  $36.45 \pm 4.7$  weeks ranging from 06 – 18 months. There was sound bony union in all of the cases with resolution of infection. The mean time of full weight bearing was  $10.45 \pm 2.25$  weeks and bone union time was  $23.26 \pm 6.33$  weeks. ASAMI score (Association for the Study and Application of the Method of Ilizarov) for bony outcome was Excellent in 13 (65%) patients, Good in 5 (25%) patients, Fair in 1 (5%) patient and Poor in 1 (5%) patient. ASAMI score for functional outcome was Excellent in 14 (70%) patients, Good in 4 (20%) patients, Fair in 1 (5%) patient and Poor in 1 (5%) patient. Rail external fixator was sufficient enough for wound healing & bony union. Limb Reconstruction System (LRS) offers an alternative option to treat compound fractures of tibia because of simplicity of application, its good fracture stability, adjustable geometry, light weight, affordable cost, patient friendly and can induce/enhance fracture healing by compression and distraction osteogenesis.<sup>10</sup>

## CONCLUSION

LRS is a simple and easy system which can be used for all open fractures. Fixation with LRS is a single definitive surgery. It is a cost-effective mode of treatment. Patient is independent and walks full weight bearing without walking aids.

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