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**Naeem Mehmood Mughal**  
Dr., Associate professor in Mohi-u-din  
Islamic Medical College  
Mirpur AJK  
[naeem.mehmood.mughal@gmail.com](mailto:naeem.mehmood.mughal@gmail.com)

**Zia Ullah**  
Dr., Doctor in Baqai medical  
university Karachi, Pakistan  
[ziasheikh44@gmail.com](mailto:ziasheikh44@gmail.com)

**Hira Naz Ali**  
Dr., Doctor in DHQ Teaching  
Hospital Sahiwal, Pakistan  
[hiraali2122@yahoo.com](mailto:hiraali2122@yahoo.com)

## ROLE OF EXTERNAL FIXATION IN OPEN TIBIAL FRACTURES AND PATIENT'S SATISFACTION

**Abstract:** *Objective: To study outcomes of external fixators as a treatment of open tibial fractures.*

*Study design and duration: This is a cross sectional study of descriptive type started in January 2018 and completed in December 2018, consisted on duration of twelve months.*

*Setting: Study was conducted in Mophi-u-din Islamic Meedical College Mirpur AJK.*

*Patients and Methods: Patients presenting in study hospital with open fracture of tibia were classified according to Gustilo Anderson classification. Patients with grade-2 and grade-3 wounds were included in this study. They were operated and external fixation was done using either N.A or A.O fixators. These patients were called for follow-up every month and outcome of external fixator was seen. Range of motion on ankle and knee joints was seen. Feedback from patients was taken, regarding their satisfaction about this treatment method. Some patients were unhappy with this technique while others were satisfied. A questionnaire was designed containing relevant questions about mechanism of injury, site of fracture, grade of wound according to G.A classification. All data was documented properly. Consent was taken from all cases in written form. Permission was also taken from ethical committee of the hospital for conducting study. Data was analyzed using Microsoft office and SPSS software, version 2017. Results were calculated in the form of percentages and expressed via tables and graphs.*

*Results: There were total 70 cases included in this study. All these cases were operated for external fixation of tibial fractures. There were both male (70%) and female (30%) cases. Age range of patients was 16-70 years with mean age 42 years. There were 21.4% patients with grade2 wound, 50% with grade 3-A and 28.6% having grade 3-B wound. There were 65% patients satisfied with external fixation method and 35% were not satisfied due to its weight and need of second operation for removal of fixator and interference with mobility of ankle or knee joints.*

*Conclusion: External fixation is a useful procedure in open tibial fractures with minimum complications and good range of motion on ankle and knee joints.*

**Key words:** External fixation, open tibial fractures, Range of motion.

**Language:** English

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### INTRODUCTION

In Pakistan fractures of upper and lower limbs in road side accidents are very common in big cities.<sup>1</sup>

Usually such patients have lower limb fractures more frequent than upper limb.<sup>2</sup> Other causes of such fractures are fall from height, fall of heavy object on

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lowe limbs and bomb blast.<sup>3</sup> These cases have open tibial fractures most of the time. In small wounds less than 1cm, closed reduction and internal fixation or splints can be used. But in Grade 2 and 3 wounds according to Gustilo Anderson classification, external fixation is a treatment of choice.<sup>4</sup> These cases need repeated debridement of wounds and due to source of infection internal fixation is not suitable. External fixation allows healing of wound and also healing of fracture. In few cases after wound healing external fixator is removed and internal fixation is done as a definite procedure.<sup>5</sup> Tibia is a superficial bone that is why its fractures are very common and very complicated. Goals of treatment of open tibial fractures are healing of wound, prevention of infection and to achieve union of bone with maximum range of motion on ankle and knee joints.<sup>5</sup> In large open wounds soft tissue coverage can be done latter on when wound is healed.<sup>6</sup>

### Patients and Methods

This is a cross sectional study conducted in orthopedic unit of a tertiary care hospital. This study was completed in duration of seven months. Patients presenting in orthopedic ward with open tibial fractures were classified according to Gustilo Anderson classification given below.

Type-1: Tibial fracture. Wound less than 1cm

Type-2: Tibial fracture. Wound more than 1cm

Type-3

3A: Tibial fracture with large wound more than 10cm but bone coverage is intact.

3B: Tibial fracture with exposed bone due to periosteal stripping, need coverage.

3C: Tibial fracture with exposed bone, need coverage and vascular injury needs repair.

Patients with grade-2 and grade-3 wounds were included in this study. They were operated and external fixation was done using either N.A or A.O fixators. These patients were called for follow-up every month and outcome of external fixator was

seen. Range of motion on ankle and knee joints was seen. Feedback from patients was taken, regarding their satisfaction about this treatment method. Some patients were unhappy with this technique while others were satisfied. A questionnaire was designed containing relevant questions about mechanism of injury, site of fracture, grade of wound according to G.A classification. All data was documented properly. Consent was taken from all cases in written form. Permission was also taken from ethical committee of the hospital for conducting study. Data was analyzed using Microsoft office and SPSS software, version 2017. Results were calculated in the form of percentages and expressed via tables and graphs. All patients in this study were completely mobile before injury with normal range of motion on ankle and knee joints.

### Results

All patients presenting in study hospital with open tibial fractures having Gustilo Anderson grade-2 or 3 wounds were included in this study. There were total 70 cases included in this study. All these cases were operated for external fixation of tibial fractures. There were both male (70%) and female (30%) cases. Age range of patients was 16-70 years with mean age 42 years. There were 5(7.1%) cases between 10-20 years age, 22(31.4%) between 21-30 years, 15(21.4%) between 31-40 years, 12(17%) between 41-50 years, 9(12.8%) between 51-60 years and 7(10%) cases were having age above 60 years. There were 15(21.4%) patients with grade2 wound, 35(50%) with grade 3-A and 20(28.6%) having grade 3-B wound. There were 65% patients satisfied with external fixation method and 35% were not satisfied due to its weight and need of second operation for removal of fixator and interference with mobility of ankle or knee joints.

#### Range of motion in knee joint after external fixation

ROM retained	N	%
More than 75% of original	10	14.3
Normal	60	85.7

#### Range of motion in Ankle joint after external fixation

ROM retained	N	%
50% of original	3	4.3
Less than 75%	5	7.2
More than 75%	7	10
Normal	55	78.5

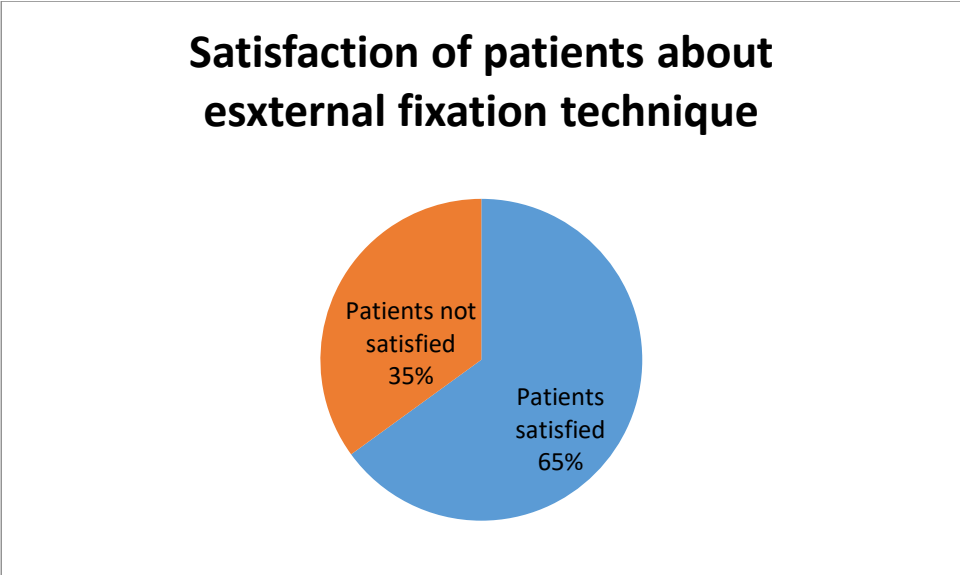
Age(years)	N	%
10-20	5	7

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21-30	22	31
31-40	15	21
41-50	12	17
51-60	9	12.8
Above 60	7	10

Gustilo Anderson Grade	N	%
Grade-2	15	21.4
Grade 3A	35	50
Grade 3B	20	28.6



Picture 1.

**DISCUSSION**

Low limb trauma is very common among Pakistani population due to road side accidents.<sup>7</sup> Tibia fracture occurs most commonly in RTA.<sup>8</sup> Other mechanisms of injury include fall from height, bomb blast, fall of heavy object on lower leg etc. Usually such patients have lower limb fractures more frequent than upper limb. Other causes of such fractures are fall from height, fall of heavy object on low limbs and bomb blast.<sup>9-11</sup> These cases have open tibial fractures most of the time. In small wounds less than 1cm, closed reduction and internal fixation or splints can be used. But in Grade 2 and 3 wounds according to Gustilo Anderson classification, external fixation is a treatment of choice. These cases need repeated debridement of wounds and due to source of infection internal fixation is not suitable.<sup>12-15</sup> In our study grade-3A fractures were more common than other types, which is different as

compared to a study conducted by Cole et al in 1995 and reported grade-3B fractures most common. Patients with grade-2 and grade-3 wounds were included in this study. They were operated and external fixation was done using either N.A or A.O fixators.<sup>16</sup> These patients were called for follow-up every month and outcome of external fixator was seen. Range of motion on ankle and knee joints was seen. Feedback from patients was taken, regarding their satisfaction about this treatment method. Some patients were unhappy with this technique while others were satisfied.<sup>17</sup> A questionnaire was designed containing relevant questions about mechanism of injury, site of fracture, grade of wound according to G.A classification. In our study range of mobility was normal in maximum cases on knee and ankle joints while in few cases it was less than 75% of normal range.<sup>18-21</sup>

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