

# Management Option in Type-III-A Open Tibial Fractures

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The management of open tibial fractures remains a challenge for the orthopaedic surgeons. The treatment modalities regarding the tibial shaft fractures are continuously in the process of modification. Of various treatment modalities available, external fixation and closed intra medullary nailing are two options. In this study we have compared the results of both treatment modalities in 30 cases (15 each). Comparable results were found in both the groups. Average time to union was 19.87 weeks for intra medullary nailing group and 22.13 weeks for the external fixator group. Delayed union was found in 3 cases in intra medullary nailing group and 5 cases in external fixator group. In our opinion both the methods can be recommended depending upon the experience of the surgeon, availability of image intensifier and socioeconomic conditions of the patients.

**Key words** Tibia, open fractures, treatment, type III A fractures of tibia.

Tibia involves about 65% of the all long bone fractures with high incidence of non-union and delayed union due to certain anatomical reasons<sup>1</sup>. Tibial fractures often occur with severe damage to the soft tissue due to its anatomical peculiarities. The management of open tibial fractures remains a challenge for the orthopaedic surgeons<sup>2,3</sup>.

The treatment modalities regarding tibial shaft fractures are continuously in the process of modification<sup>2</sup>. In the beginning method of fixation was simple plaster cast, then pins and plaster were used for the fractures to provide stability to the fracture<sup>3,4</sup>. With the introduction of external fixators the management of soft tissues was facilitated to a greater extent. Then plating and intramedullary nailing were introduced. Later on the system of interlocking was introduced.

In this particular study, the objective was to compare the results of management of open tibial fractures type III-A with external fixator versus closed intramedullary interlocking nailing.

## Materials and Methods

The study included 30 cases received in the Emergency or shifted from other units to Lahore General Hospital/ Mayo Hospital, Lahore. Patients were randomly selected. 15 patients were managed by closed intra medullary interlocking nailing and 15 were treated with AO external fixator.

Fixators were applied in the casualty operation theatre as well as in the main operation theater where as all the nailings were performed in the main operation theatre on the next list.

The patients received in emergency with open tibial fractures were thoroughly assessed. Intravenous lines were established, analgesia and antibiotics started immediately and tetanus prophylaxis was given. The wounds were examined and fractures were classified according to Gustilo-Anderson classification. Fractures fulfilling criteria of Type III-A according to the classification were included in the study.

Under spinal or general anaesthesia, the limb was prepared for surgery by painting with pyodine and irrigating the wound with normal saline, limb was draped and debridement done after extending the wound.

Then fractures were stabilised with external or closed intramedullary nailing. Patients were discharged once wounds healed and then were called in OPD for follow up and evaluated both clinically as well as radiologically.

## Results

Majority of the patients 27(90%) were male. Most common mode of injury was road traffic accident. 20(66.7%), and 5(16.7%) sustained firearm injuries. Most of patients were in 3<sup>rd</sup> and 4<sup>th</sup> decade of life. Thirteen (43.3%) were from the poor class and 17(56.7%) were from middle class.

Table 1. Distribution according to mode of injury

Mode of injury	No. of cases	%age
Road traffic accident	20	66.70
Fire arm injuries	5	16.7
Domestic	1	3.3
Occupational	2	6.7

Mean time lapse between surgery and incidence for intra medullary nailing was 33.5 hours and for external fixator group was 22 hours. Mean time to soft tissues healing was 3 weeks for intra medullary nailing group and 3.5 weeks or external fixator group. Mean time to union was 19.8 weeks for I/M nailing group and 22 weeks for external fixator group. Mean duration of hospital stay was 3 weeks for intra medullary nailing group and 3.5 weeks for external fixator group.

Wound infection occurred in 5 patients in external fixator group and in 4 patients in intra medullary nailing group. Delayed union occurred in 5(33.3%) cases external fixator group while in intra medullary nailing group it occurred in 3(20%) of cases. No significant shortening was found in both the groups.

## Discussion

The open type III-A tibial fractures were common in male population, male to female ratio is higher in our population than in Behrens, 1986, Cole, 1995 and this is because in our society female have less chances of getting out of their homes<sup>1,2</sup>.

Table 2. Distribution according to sex

Sex	No. of cases	%age
Male	27	90
Female	3	10

Table 3: Complications

Complication	Closed intramedullary nailing	External fixator
Wound infection	4	5
Prosthesis failure	2	0
Delayed healing	3	5
Limb shortening	0	1
Osteomyelitis	3	7

Peak incidence is 3<sup>rd</sup> and 4<sup>th</sup> decade as compared to Behrens and Searles study in which peak incidence was 30 years of age. Most common mode of injury was road traffic accidents (66.7%) and in Cole series was 26% but 2<sup>nd</sup> common mode of injury in our study was firearm (16.7%) and in Cole series it was only 5%.

Incidence of pin tract infection in our study (46.7%) is also comparable to Daved et al<sup>4</sup> (15-36%) and Bone et al<sup>2</sup> (35%).

Delayed union our series (33.3%) in external fixator group is comparable to Crammer et al,<sup>8</sup> (38%).

Wound infection in our series (33.3%) is higher as compared to Gustilo-Anderson<sup>6</sup> (4%). Infection rate in intra medullary nailing group was 20% in our study while it was 4.5% in Krettek et al 1990 delayed union was 20% in our study and it was comparable to Hope and Cole et al 1992 (15%).

## Conclusion

Mean age of the patients in intra medullary nailing group was 37.53% year ( $\pm 14.38$  SD) as compared to 33.47 years ( $\pm 10.59$  SD) in external fixator group. Mean time to union

in intra medullary nailing group 19.89 weeks ( $\pm 4.12$  SD) as compared to 22.13 weeks ( $\pm 4.47$  SD). Although there appear to be shorter time to union in intra medullary nailing group as compared to external fixator group, but this difference fails to achieve statistical significance by using Students T test ( $p=0.08$ ).

External fixator group had pin tract infection 46.6% and in intra medullary nailing group there was higher incidence ankle stiffness (26.6% versus 20%) knee stiffness (20% versus 13.3%), but lower incidence of wound infection (26.6% versus 33.3%) delayed union (20% versus 33.3%) malunion (0vs 13.3%).

But these differences were not statistically significant when analysed by using test for Standard Error of Differences between percentages. Smaller number of cases in each group in this study made it impossible to achieve the statistical significance when comparing small differences but hopefully future work along the same lines will help in removing this problem. This study can act as useful base for setting up large prospective control trials to compare the result of two techniques in greater details.

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