

## Functional outcome of interlocked intramedullary nailing fixation in management of closed tibia shaft fractures

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**Objective:** To assess prospectively functional outcome of interlocked intramedullary nailing fixation in management of closed tibia shaft fractures.

**Methodology:** This prospective study included 134 patients with closed shaft tibia fractures with age 18-60 years and isolated closed fracture of shaft of tibia. The fractures were fixed by interlocking intramedullary nail. At follow-up after 12 months postoperatively, the functional outcome was assessed radiographically for the sign of union and clinically according to Klemm-Borner criteria.

**Results:** The mean age was 38.55 years. Out of 134 patients, 55.2% were male. The cause was

road traffic accident in 44.8%, majority of the fracture occur in the mid-shaft (41.8%), and oblique fracture was the commonest type which accounted for 35.1%. The anterior knee pain was the commonest complications after surgery (11.9%). More than 90% patient achieved normal or less than 5° angulation. The functional outcome was excellent in 67.9%, good in 29.9% and only 2.2% had fair results.

**Conclusion:** Interlocking intramedullary nailing is a good choice in the treatment of most closed shaft tibia fractures. (Rawal Med J 202;46:890-893).

**Keywords:** Interlocking intramedullary nail, closed fracture, tibia fracture.

### INTRODUCTION

Tibia shaft fractures are one of the commonest long bone fractures with many complications.<sup>1</sup> The subcutaneous location of the bone make it venerable to trauma.<sup>2</sup> Tibia bone has precarious blood supply when compared with other appendicular bones due to an insufficient muscular envelope. No rotation deformity is accepted in fracture shaft tibia because both knee and the ankle joints are hinge synovial type.<sup>3,4</sup> Compartmental syndrome, neurovascular injury, malunion, and non-union are the main complications.<sup>5</sup>

Several modalities for the management whether non-operative or operative,<sup>6</sup> have been used and the surgeons can choose a variety of implants for fracture fixation ranging from external fixation, plating to intramedullary nailing.<sup>6,9</sup> For simple shaft fractures, interlocking is the ideal implant globally and the method of choice for unstable and displaced tibia shaft fractures in the adult.<sup>7,10,11,12</sup> That is why we conducted this study to evaluate the functional outcome both clinically and radiologically of the

displaced fracture shaft tibia fixed by interlocking intramedullary nailing.

### METHODOLOGY

This prospective study on 134 patients with fracture of the tibia was conducted at Al-Kindy and Al-Basrah Teaching Hospitals, Iraq from April 2016 to January 2020. All patients were Iraqi nationals. Inclusion criteria were closed isolated tibia shaft fractures in 18-60 years old, while open, intra-articular tibia fractures and co-morbidity patients (diabetic, renal failure) were excluded from the study. Inform written consent was taken from all of the patients. The study was approved by Scientific Affairs of Al-Kindy College of Medicine.

All patients had x-rays of full length of entire tibia lateral and anteroposterior views of involve leg. The surgery is done under general anesthesia in supine position. Preoperative prophylaxis antibiotic was one gram of third-generation cephalosporin half-hour prior surgery. Locked intramedullary nail of appropriate size and width (usual nail size about 10-

11 mm) were stabilized the fracture after reduction under image intensifier, then skin suturing and bandaging of the leg (Fig.).

The patients were encouraged to active physiotherapy immediately after surgery for the knee and the ankle joints. The patients were allowed non-weight bearing crutch walking on the next postoperative day. They were discharges from hospital on next day and followed weekly for the first two weeks, skin sutures were removed on the 14 days after surgery. No dynamization was done and the follow-up was done at 6, 12, 24, and 36 weeks. At last follow up after one year, each patient was assessed radiographically for a sign of union and clinically according to Klemm-Borner criteria, which included four levels of the functional outcome as follow:<sup>13</sup>

**Excellent:** Full knee and ankle motion, no muscle atrophy and normal radiographic alignment. **Good:** Slight loss of knee and ankle motion (<25°), less than 2cms of muscle atrophy and angular deformity of <5°. **Fair:** Moderate (25°) loss of knee or ankle motion, more than 2 cm of muscle atrophy and angular deformity of 5-10°. **Poor:** Marked loss of knee or ankle motion (> 25°), marked muscular atrophy and angular deformities > 10° (by AP and Lat. X-Ray)

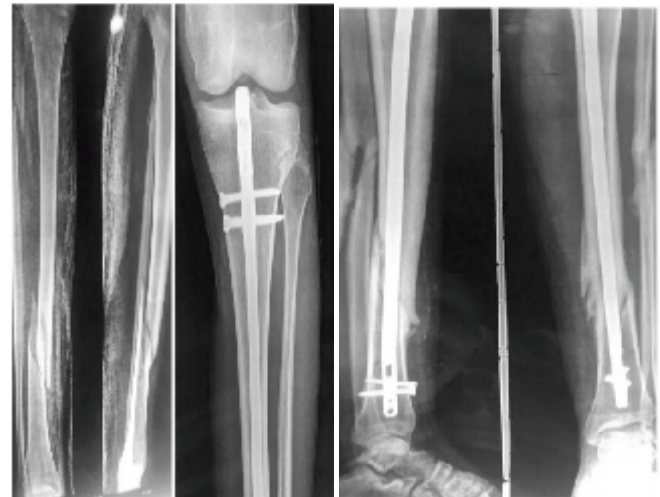
**Statistical Analysis:** Data were analyzed through SPSS version 21.

**RESULTS**

Our study involves 134 cases and age group of our patients was above 18 years and below 60 with the mean age 38.55 year, 55.2% were male. The road traffic accident was the mode of injury in 60(44.8%) patients, followed by fall from height 45(33.6%) patients, and lastly, 29(21.6%) patients have sports injury (Table 1).

Early partial weight-bearing started with aid of crutches next day of surgery occur in 75(56%) patients, in 40 patients within 5 days (29.8%) postoperatively and in 19 patients, after 10 days (14.2%). Regarding the complications, the anterior knee pain occurs in 16 patients (11.9%), followed by the delayed union in 6 patients (4.5%) and nonunion, superficial infection occurs in two patients for each (1.5%) (Table 2)

**Fig. X-ray of fracture shaft tibia before and after fixation.**



**Table 1. Distribution according to gender, mode of injury, level of fracture, fibula fracture, and type of fractures.**

Item	Type	No.	%
Gender	Male	74	55.2
	Female	60	44.8
Nature of injury	Road traffic accident	60	44.8
	Fall from height	45	33.6
	Sport injury	29	21.6
Level of fracture	Midshaft	56	41.8
	Lower third	40	30
	Upper third	38	28.2
Fibular fracture	Yes	113	84.3
	No	21	15.7
Type of fracture	Spiral	47	35.1
	Oblique	40	29.8
	Comminuted	35	26.1
	Transverse	12	9

**Table 2. Type of complications.**

Complication	No.	(%)
Anterior knee pain	16	11.9
Delay union	6	4.5
Infection.	2	1.5
Nonunion	2	1.5

**Table 3. Radiographic alignment.**

Alignment	No.	%
Normal radiographic alignment	91	67.9
Angular deformity of <5°	40	29.9
Angular deformity of 5-10°	3	2.2

We found there are 23 patients (17.2%) had associated mild limping. Radiological evaluation of the patient by anteroposterior and lateral views showed that there were 91 (67.9%) patients had normal radiographic alignment, 40 (29.9%) had angulation less than 5°, and only 3 cases (2.2%) had 5-10° of angular deformity (Table 3).

## DISCUSSION

Over the past decade it has come to be recognized that, in tibia diaphyseal fractures, intramedullary nails are more useful for fracture healing and function than other available methods of treatment like casting and plating.<sup>14</sup> In our study, the mean age was 38.55 years, similar to study of Patel et al,<sup>15</sup> higher than Rathwa et al,<sup>16</sup> Katta<sup>17</sup> and Radhakrishna et al.<sup>18</sup>

More than half of our patients were males (55.2%), this parallel to results of Patel et al,<sup>15</sup> and lower than Rathwa et al,<sup>16</sup> Katta<sup>17</sup> and Radhakrishnan et al.<sup>18</sup> In our study, two cases showed no sign of union after 9 months follow up (1.5%) and 6 cases delayed union all of them involve the third shaft fracture. This lower than result obtains by Patel et al,<sup>15</sup> and Blachut et al<sup>19</sup> and similar to the results of Rathwa et al<sup>16</sup> and higher than those of Katta,<sup>17</sup> Court-Brawn et al<sup>20</sup> and Radhakrishna et al.<sup>18</sup>

Regarding infection, two of our patients had infection (1.5%) which is similar to Rathwa et al<sup>16</sup> and Court-Brawn et al,<sup>20</sup> lower than those of Patel et al,<sup>15</sup> Radhakrishna et al,<sup>18</sup> and Katta.<sup>17</sup> The interlocking nail fixation restores length, alignment, biological osteosynthesis, and reduce rates of infection and mal-union.<sup>21</sup> Intramedullary nail fixation is well-known as a typical method of fixation for diaphyseal fractures of the long bone (comminuted, oblique, spiral, and transverse fractures) regardless of the harmful effect like anterior knee pain, thermal necrosis, infection and re-fracture.<sup>8</sup>

## CONCLUSIONS

Interlocking intramedullary nailing is a good selection in the fixing most of the closed tibia shaft fractures with minimal complications.

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