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Reamed intramedullary interlocking nailing in diaphyseal fractures of tibia in adults: A study or 50 cases

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Abstract

Introduction: No fracture in the body has generated more heat and argument between the conservative and radical group of surgeons than the fracture of tibial shaft in adults. The management of tibial diaphyseal fracture has always held particular interest for orthopaedic surgeon not only because they are common, but they are often difficult to treat. Interlocking intramedullary nailing of tibia greatly improves rotational stability & can be used for axially unstable fracture. Thus use of interlocking nails means that virtually all tibial diaphyseal fractures can be stabilized with intramedullary nail. We decided to study the role of interlocking nail in diaphyseal fractures of tibia.

Materials and Methods: The present study consisted of 50 cases of fracture shaft tibia treated with reamed interlocking intramedullary nail. All patients were treated on indoor basis. Patients were studied from January 2002 to February 2004 with maximum follow up of 2 yr and minimum follow up of 4 months with average follow up of 1 yr. The study was conducted in Department of Orthopaedics, New Civil Hospital, Surat. Patients in the study were selected on the basis of inclusion criteria. Evaluation of results was carried as per criteria devised by Ekeland.

Results and Discussion: The results of operated fracture tibia fibula with interlocking nail were classified as excellent, good, fair and poor according to the criteria devised by Ekeland. In the present series, 94% of the patients had excellent to good results which is similar to Ekeland series (94%). Two patients had fair results and one patient had poor result.

Conclusion: Though the series is relatively small, it appears that reamed Intramedullary interlocking nailing is good, effective and safe method of treatment for closed and open grade I, fractures and also comminuted, unstable tibial diaphyseal fracture located within 7 cm below the knee joint and 5 cm above the ankle joint.

Keywords: intramedullary, interlocking, diaphyseal fractures

Introduction

No fracture in the body has generated more heat and argument between the conservative and radical group of surgeons than the fracture of tibial shaft in adults. The method of choice of treatment continue to remain controversial. In today's fast-moving mechanized world, vehicular accidents are increasing day by day and so, tibial diaphyseal fractures are continue to be common orthopaedic problem. The management of tibial diaphyseal fracture has always held particular interest for orthopaedic surgeon not only because they are common, but they are often difficult to treat.

Nicoli said for tibial diaphyseal fracture

Every fracture is an Individual problem and the decision to treat it by internal fixation or Indeed conservatively should be based on realistic assessment of the advantages and hazards of each method in circumstances of that particular cases. This calls for high degree of clinical judgement which is harder to acquire or to impart, than technical virtuosity in operating theatre^[1]. Due to its anatomical location, tibia is exposed to frequent injury. As one third of its surface is subcutaneous throughout most of its length, open fractures are common in tibia than closed, furthermore, blood supply of the tibia is more precarious than that of bones enclosed by heavy muscles.

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Presence of the hinge joints, knee and ankle joint allows no adjustment for the rotatory deformity, so accurate reduction is required to avoid deformity and good functions of the joints.

Tibial diaphyseal fracture commonly affects young males, severe fractures complicated by nonunion or infection often results in loss of employment or other social & economic problems.

Interlocking intramedullary nailing of tibia greatly improves rotational stability & can be used for axially unstable fracture. Thus use of interlocking nails means that virtually all tibial diaphyseal fractures can be stabilized with intramedullary nail² We decided to study the role of interlocking nail in diaphyseal fractures of tibia.

AIM: To study the role of interlocking nail in diaphyseal fractures of tibia.

Materials and Methods

The present study consisted of 50 cases of fracture shaft tibia treated with reamed interlocking intramedullary nail. All patients were treated on indoor basis. Patients were studied from January 2002 to February 2004 with maximum follow up of 2 yr and minimum follow up of 4 months with average follow up of 1 yr. The study was conducted in Department of Orthopedics, New Civil Hospital, Surat.

All patients were selected on the basis of following *criteria*.

- a. Fracture was either closed or open type I, II or IIIa.
- b. The fracture was within 7.5 cm below the knee joint and 5 cm above the ankle joint.

Initial management

On admission, a detailed clinical history was taken to know the nature of injury and detailed clinical examination was carried out including systemic examination to rule out associated injuries. Intravenous fluids were given as per need of the patient. All patients were given parenteral antibiotics, analgesics and tetanus prophylaxis.

Type of fracture, level of fracture, distal neurovascular status were assessed and recorded. In cases of open fracture, size of wound, locations of wound and surrounding skin condition were assessed and recorded. Wound was thoroughly irrigated with plenty of normal saline and sterile dressing was applied and above knee plaster slab was given for immobilization of affected limb.

Anteroposterior and lateral roentgenograms of the affected limb were taken including knee and ankle joints to know the level of fracture and geometry of fracture. The affected limb was elevated on two pillows or Bohler's splint and patient was encouraged to move his toes actively.

Selection of the nail

In the present series, patients' fractures were stabilized with AO type of interlocking nail of stainless steel and locking was done with the 4.5mm cortical screw or 3.9mm self-tapping interlocking bolts. Length of the tibia was measured from tip of the tibial tuberosity to ankle joint line, anteriorly in normal limb. In case of bilateral fracture tibia, length was measured intraoperatively by using two guide wire of identical length, under image intensifier television (IITV).

Operative technique

As soon as the patient was fit for anaesthesia, patient was shifted to operation theatre. Operation was carried out under spinal or epidural or general anaesthesia. In case of open fracture

thorough debridement was carried out. Patient was given supine position on simple table with leg hanged by the side of table or at the edge of table. Affected limb was prepared and draped.

Incision

A 3-4 cm long vertical midline incision, starting from the lower pole of patella to tibial tuberosity was taken. Skin, subcutaneous layer were cut and patellar tendon was splitted. Alternatively, medial incision was taken, one finger breath medial to tibial tuberosity, starting from medial site of lower pole of patella and going distally 4-5 cm. Skin, subcutaneous layer were cut and patellar tendon was retracted laterally.

Entry point

With the help of a curved awl, entry for the nail insertion was made just above and medial to rough part of tibial tuberosity, about 1 to 1.5 cm below the joint line. Entry point was connected to the medullary canal of the shaft of the tibia, which was confirmed by extrusion of bone marrow, containing fat globules. Once entry was taken, small diameter of hand reamer was inserted and the proximal fragment was reamed. Reaming was done with reamer of increasing diameter. Reaming was stopped when increased resistance was felt. Closed reduction was done and guide wire was inserted through the entry point and negotiated across the fracture site, in distal fragment. Position of guide wire was checked under image intensifier television (IITV) in both anteroposterior and lateral view. When the guide wire was in acceptable position, nail with jig was inserted over the guide wire and crossed through fracture site. Reduction was checked under image intensifier television (IITV). Once reduction was satisfactory then distal locking was done with freehand technique under image intensifier television (IITV). Proximal locking was done through jig. Position of nail and screws were screened under image intensifier television (IITV). The jig was removed and wounds were closed in layers. A below knee plaster slab was given. In case of open fracture, wounds were left open.

Post-operative care

Postoperatively, the limb was elevated on two pillows or Bohler's splint. Patient was encouraged to do active toe movements, Static quadriceps exercise and knee bending were started as soon as pain subsided. Parenteral, broad spectrum antibiotics were given for 3 days. Analgesics were given as per the need. Oral antibiotics were given till sutures removal. First postoperative dressing was done on 2nd postoperative day. Postoperative check x-rays were taken to see the position of implants and reduction. Sutures were removed on 12 th postoperative day and PTB cast was given. Patient was discharged with PTB (Patellar tendon bearing) cast and advised non weight bearing. Wounds of the open fractures were dressed regularly and as soon as local area was healthy, wound was covered with split thickness skin graft.

Follow up

All patients were called for follow up after 6 weeks. On follow up, thorough clinical examination was done and check X-rays were taken to see the signs of union and position of implant. At 6 weeks, partial weight bearing was allowed depending on the progression of healing and associated injury with pair of axillary crutch or walker and patient was again called for follow up at 10 to 12 weeks.

At 10-12 weeks, if signs of union were present clinically and radiologically, patient was advised to bear full weight on

affected limb with PTB cast. If sign of union were not present at 10-12 weeks. Then dynamization was done by removing locking screws from the large fragment and patient was allowed for full weight bearing with PTB cast.

On final follow up at 16-20 weeks, depending on complete clinico radiological union unsupported full weight bearing was allowed. In absence of clinico radiological sign of union procedure like cancellous bone grafting with or without exchange nailing were done.

All these observations were recorded as per proforma.

Final follow up (between 16 to 18 weeks)

Complaints: Pain/ movements at fracture site Local examination of limb: movements at fracture site / deformity/ tenderness / skin condition Movements of the knee & ankle joint: flexion & extension of knee/ dorsiflexion & planter flexion of ankle.

X-ray: Status of union/ position of implant/ sign of infection if any unsupported full weight bearing

Secondary procedure-cancellous bone grafting exchange nailing + bone grafting

- implant removal. Total time of union in weeks Complications:

-Non union

-Implant failure

-Discrepancy of limb length

- Osteomyelitis

Table: Evaluation of result as per criteria devised by Ekland [3].

	Excellent	Good	Fair	Poor
Tibial malalignments and shortening				
Varus or valgus	2.5	5	10	>10
Anticurvatum or recurvatum	5	10	15	>15
Internal rotation	5	10	15	>15
External rotation	10	15	20	>20
Shortening	1 cm	2 cm	3 cm	>3 cm
Range of knee motion				
Flexion	>120	120	90	<90
Extension deficit	5	10	15	>15
Range of ankle motion				
Dorsiflexion	>20	20	10	<10
Plantar flexion	> 30	30	20	< 20
Pain	None	Sporadic	Significant	SEVERE
Swelling	None	Minor	Significant	SEVERE

Observations and Results

The present series is a prospective study of 50 cases of tibial diaphyseal fractures treated by reamed intramedullary interlocking nails. Our findings were compared with that of literature as and when possible.

Table 1: Age Distribution

Age Group	No. of patients	Percentage
Less than 20 years	04	08%
20-40 years	36	72%
41-60 years	08	16%
More than 60 years	02	04%
Total	50	100%

The youngest patient was 18 years old and the oldest patient was 62 years old. Majority of the patients i.e. 72% were between age group of 20 to 40 years. The mean age was 33.6 years.

Table 2: Mean Age

	Present series	P.A. Blachut [4]	Ekland [3]
Mean age (in years)	33.6	35	35

As evident from table no.2, mean age was practically similar in all series.

Table 3: Distribution of patients according to gender

	Present series		P.A. Blachut series [4]		Ekland series [3]	
	No.	%	No.	%	No.	%
Male	45	90.00	58	75.32	28	65.11
Female	05	10.00	19	24.68	15	34.89
Total	50	100.00	77	100.00	43	100.00

As per the table no. 3, in all the series, number of male patients were higher than female patients.

Table 4: Nature of injury

Nature of injury	Present Series		P.A Blachut series [4]		Ekland series [3]	
	No.	%	No.	%	No	%
Road traffic accident	46	92.00	-	40.00	-	51.00
Fall from height	03	06.00	-	-	-	-
Assault	01	02.00	-	-	-	-
Total	50	100.00	-	-	-	-

As shown in the table no.4, in the present study, fractures occurred due to vehicular accidents, fall from height or assault. Fracture due to vehicular accident was common cause in all series.

Table 5: Limb involved

Side	Present series		P A Blachut series [4]	
	No.	%	No.	%
Right	32	64.00	-	54.00
Left	15	30.00	-	45.00
Bilateral	03	06.00	-	01.00
Total	50	100.00	-	100.00

As noted from the table no.5. In both series, majority of the patients sustained fractures on right tibia.

Table 6: Closed or open injury

Type of injury	Present series		P.A. Blachut series ⁴		Ekland series ³	
	No.	%	No.	%	No.	%
Closed	27	54.00	77	100.00	40	88.89
Open type I	15	30.00	00	00.00	02	04.44
Open type II	06	12.00	00	00.00	03	06.67
Open type III	02	04.00	00	00.00	00	00.00
Total	50	100.00	77	100.00	45	100.00

As per table no.6, number of closed fractures were more in the present and Ekland series. P.A. Blachut had studied closed tibial diaphyseal fractures.

Table 7: Level of fracture

Level Of Fracture	Present Series		P.A. Blachut Series ^[4]		Ekeland Series ^[3]	
	NO.	%	NO.	%	NO.	%
U/3rd	03	06.00	02	02.74	10	22.22
U/3rd M/3rd	01	02.00	04	05.48	02	04.44
M/3rd	18	36.00	24	32.88	15	33.34
M/3rd L/3rd	21	42.00	25	34.24	16	35.56
L/3rd	07	14.00	18	24.66	02	04.44
Total	50	100.00	73	100.00	45	100.00

As revealed by the table no 7, in all the series, fractures at the level of middle third and middle third lower third level were more common.

Table 8: Fracture geometry

Fracture geometry	Present series		P.A. Blachut series ^[4]		Ekeland series ^[3]	
	NO	%	No.	%	No.	%
Oblique	40	80.00	25	34.24	20	42.00
Transverse	07	14.00	20	27.39	12	27.00
Spiral	02	04.00	23	31.53	08	20.00
Segmental	01	02.00	05	06.84	05	11.00
Total	50	100.00	73	100.00	45	100.00

As per table no.8, oblique and transverse fractures were more common in all three series.

Table 11: Intraoperative complications

Type of complications	Present series		P.A. Blachut series ^[4]		Ekeland series ^[3]	
	No.	%	No.	%	No.	%
Skin abrasion at entry site	01	02.00	00	00.00	00	00.00
Intraoperative fractures	01	02.00	02	02.80	02	04.60
Distraction at fracture site	01	02.00	00	00.00	00	00.00
Total	03	06.00	02	02.80	02	04.60

All the Intraoperative complications listed in the table no.11.

Table 12: Postoperative complications

Type of complications	Present series		P.A. Blachut series ⁴		Ekeland series ³	
	No.	%	No.	%	No.	%
(a) Early complications						
(i) Compartment syndrome	01	02.00	00	00.00	00	00.00
(ii) Fixation of fracture in rotation	01	02.00	03	04.00	00	00.00
(b) Late complications						
(i) Infection	03	06.00	00	00.00	01	02.32
(ii) Non union	00	00.00	03	04.00	01	02.32
(iii) Delayed union	01	02.00	00	00.00	00	00.00
(iv) Failure of implant	01	02.00	03	04.00	00	00.00
(v) Impingement of nail at entry site	01	02.00	00	00.00	00	00.00
(vi) Malunion	00	00.00	03	04.00	00	00.00
Total	08	16.00	12	16.00	02	04.64

All postoperative complications depicted in the above table.

Table 13: Treatment of wound in open fracture grade ii and above

Type of Treatment	Present series		P.A. Blachut series ^[4]		Ekeland series ^[3]	
	No.	%	No.	%	No.	%
Dressing	05	62.50	-	-	03	100
Split thickness Skin grafting	03	17.50	-	-	00	00.00
Total	08	100.00	-	-	03	100.00

As per table no. 13, out of 8 patients having open fracture grade

Table 9: Associated injury

	Present series		P.A. Blachut series ^[4]		Ekeland series ^[3]	
	No.	%	No.	%	No.	%
Associated injury	18	36.00	21	29.00	-	-

As seen from table no.9, the associated injuries were practically similar in all the series.

Table 10: Injury – treatment interval

	Present Series	P.A. Blachut series ^[4]
Average interval between injury to treatment	24 hours	17 hours

In the present study, most of the patients were operated within 24 hours of the injury, which is similar to P.A. Blachut series.

I1 and above, in five patients, wounds were healed with dressing and three patients needed split thickness skin grafting. None of the patient needed split thickness skin grafting in Ekeland series.

Table 14: Dynamization

	Present series	P.A. Blachut series ^[4]	Ekeland series ^[3]
Median time of dynamization	13.89 weeks	11.00 weeks	13.00 weeks

As per table 14, the median time of dynamization is similar in present series and Ekeland series.

Table 15: Union time

Present series	P.A. Blachut series ^[4]	Ekeland series ^[3]
Median union time (in weeks)	16.56	16.00

As reviewed from the table no. 15, the median union time of the tibial diaphyseal fracture was similar in both series.

Table 16: Union time in closed and open fractures

Union time (in weeks)	Closed and open grade I		Open grade II and above	
	No.	%	No.	%
9 - 12	00	00.00	00	00.00
13 - 16	30	66.66	03	06.66
17 - 20	07	15.54	05	11.14
> 20	00	00.00	00	00.00
Total	37	82.80	08	17.18

As shown in table no. 16, most of the patients with closed and open grade I fractures were united in 16 weeks while open grade II and above fractures were united in 20 weeks.

Table 17: Return to same work

Present series	P.A. Blachut series ^[4]	Ekeland series ^[3]
Average time return to same work	17.91 weeks	12 weeks

As evident from table no. 17, majority of the patients were returned to their own work within average time of 17.91 weeks. Thus the average time to return to same work was longer in the present series compared to series reported by Ekeland.

Table 18: Follow up

Present Series	P.A. Blachut series ^[4]	Ekeland series ^[3]
Average period of follow up (in months)	11.62	12

As per table no. 18, most of the patients were followed up for average period of 12 months which was comparable to the series reported by P.A. Blachut.

Table 19: Results

Results	Present Series		Ekeland series ^[3]	
	No.	%	No.	%
Excellent	27	60.00	29	64.45
Good	15	33.34	13	28.89
Fair	02	04.44	02	04.44
Poor	01	02.22	01	02.22
Total	45	100.00	45	100.00

As depicted from the table no. 19, majority of the patients had excellent to good results in the present series which was similar to Ekeland series.

Table 20: Subjective evaluation

Self-assessment	No. of patients	Percentage
Satisfied	43	95.56
Not satisfied	02	04.44
Total	45	100.00

As per table no. 20, majority of patients (95.56%) were satisfied with the treatment.

Discussion

"Although the method of fracture management have changed throughout medical history, the goal of physicians had remained constant since the time of Hippocrates: To restore the patient to his optimal anatomic and functional state."-Gustilo R. B ^[5].

The present study was prospective study of 50 cases of tibial diaphyseal fracture treated with reamed intramedullary interlocking nail. Five patients did not return to follow up, hence final results were analysed in 45 patients. All the patients were treated at Department of Orthopaedics, New Civil Hospital, Surat. Between January 2002 to February 2004.

Diaphyseal fractures of tibia are among the most serious skeletal injury. With increasing industrialization and number of vehicles on road, incidence of tibial diaphyseal fractures are increasing.

In the present series, average age was 33.6 years which is comparable with P.A. Blachut and Ekeland series (35 years). Thus the young and active persons are more vulnerable to injury, due to their more active life.

In the present series, number of male patients were more than female. The observation in the present series is almost similar to P.A. Blachut and Ekeland series. Due to Indian customs, males are doing more outdoor work, so there are more commonly affected.

In the present series, majority of the fractures (92%) were caused by road traffic accidents which is comparable to observation of the other two series. This may be due to increased number of vehicles on road, poor traffic sense and poor traffic education.

In the present series, more than half of patients had injury over right tibia which is comparable with the series reported by P.A. Blachut (54%).

Due to subcutaneous location of tibia, severe bone and soft tissue injury is frequent and there is high incidence of open fracture ^[2]. In the present series 46% of the fractures were open, our observation is consistent with the literature.

In the present series, 78% of the fractures were middle third and middle third lower third level which is similar to Ekeland series (74%) and P.A. Blachut series (67%).

In the present series, 80% of the fractures were oblique and 14% were transverse while in a P.A. Blachut series, 35% were oblique and 28% were transverse and in Ekeland series, 42% were oblique and 27% were transverse fractures.

Usually fracture of the tibia fibula is sustained due to high energy trauma, such patients are likely to have skeletal and extraskelatal injuries. In the present series, 18 patients (36%) had associated skeletal and extraskelatal injuries while in the P.A. Blachut series, 29% of the patients had associated skeletal injury. Possibility of the associated injury must be kept in the mind while treating the patient with fracture tibia fibula. Life and limb threatening injury should be addressed first. Injury associated in the same limb may have an effect on the final result of fracture tibia fibula.

Insertion of reamed intramedullary interlocking nail requires good technical skill. Deliberate, step-by-step technique ensures that fracture is satisfactorily aligned ^[6]. Damage to skin at the entry site is known complication of nail insertion. One patient (case no.20) had abrasion at the entry site in the present series. This can be prevented by the use of skin protector and full flexion of the knee joint. Non reaming of distal fragment may lead to distraction at the fracture site while inserting nail. One patient (case no. 22) had distraction at fracture site in present series. This can be prevented by proper reaming of distal fragment and inserting the nail or applying thrust at heel before doing proximal locking.

Intraoperative fracture is likely complication of the intramedullary nailing. Eccentric placement of guide wire, eccentric reaming, use of thick nail and forceful hammering of nail are responsible for comminution at fracture site [7]. One patient (case no. 39) had Intraoperative fracture in the present series while two patients had Intraoperative fracture in Ekeland series. This can be prevented by central placement of guide wire in both anteroposterior and lateral view and nail should advance with each hammer blow and if pitch rises, stop hammering and check the position of the nail in both anteroposterior and lateral views.

Fixation of the fracture in internal rotation is known complication of interlocking nail. This may be due to the inadequate preoperative traction and poor positioning of the patient on fracture table at the time of operation. One fracture was fixed in internal rotation in the present series while three patients had an external rotation in P.A. Blachut series. This can be prevented by maintaining neutral rotation throughout the surgery especially before inserting the nail. During the distal locking, the axis of the leg should be adjusted by manipulating the thigh or by changing the axis of the image intensifier and not by handling the foot which may cause rotation at fracture site and check the rotation before doing proximal locking.

Open tibial diaphyseal fracture carry higher risk of infection because of precarious blood supply of the tibia and less muscle mass surrounding the bone. Three patients had infection in the present series. Out of three, one patient (case no.2) had a superficial infection which healed with antibiotics and dressing. Two patients (case no. 1 and 3) had deep infection with pus discharging sinus and healed after removal of nail. In Ekeland series, one patient had superficial infection and one had deep infection. In the present series, interlocking nailing were done in open grade I, II and IIIa fractures. Unfortunately, the patient with open grade IIIa did not return to follow up. Judicious use of antibiotics, adequate debridement should prevent infection in open fractures. Infection rate in the present series is practically similar to other series.

Tibial diaphyseal fracture is the commonest cause of compartment syndrome and reaming may also rise compartment pressure. The passage of any instrument down the intramedullary canal results in transient elevation of pressure in the anterior compartment [6]. A displaced shortened tibial fracture will result in lowering of intracompartment pressure when muscles are pulled out to length the pressure increases and thus it is this reduction of the fracture that causes rise in the pressure [6]. Nailing done too soon after injury may increase the risk of compartment syndrome. One patient (case no. 33) developed compartment syndrome postoperatively and was treated by urgent fasciotomy. This complication can be prevented by proper preoperative assessment, elevation and close monitoring during early postoperative period.

Impingement of the nail tip at the entry site is known complication of interlocking nailing of tibia, due to large proximal flare of the nail or inadequate insertion of the nail or too distal entry [7]. One patient (case no.32) had impingement at the entry site in the present series, due to inadequate insertion of nail. This can be prevented by adhering to strict technique regarding proper entry and length.

The term delayed union describes an ununited fracture that continues to show progress towards healing. Usually normal time for union in fracture tibia is 12 to 20 weeks. Poor blood supply, boneloss, infection and insufficient functional use are responsible for delayed union [6]. One patient (case no. 1) had delayed union in the present series, due to deep infection.

Control of infection with antibiotics, dressing and continue weight bearing with patellar tendon bearing cast and removal of proximal locking screw resulted in union.

Nonunion is a likely complication of the tibial diaphyseal fracture. The definition of what constitute a tibial nonunion is difficult. FDA panel defined nonunion as "when minimum of nine months has elapsed since injury and the fracture shows no visible progressing sign of healing for three months. The series reported by Ekeland, one patient had a nonunion and in series reported by P.A. Blachut three patients had nonunion. Fortunately, in the present series, no patient had nonunion. However, number of patients are similar in the present series and Ekeland series while number of patients are high in P.A. Blachut series.

Perioperative complications after reamed nailing such as venous thrombosis, arrhythmias, fat embolism and pulmonary embolism are likely. In the present series, all patients were treated with reamed nailing, none of the patients had such complications.

Dynamization means removal of proximal or distal locking screws that considered least critical for fracture stability and allows axial impaction of the fracture and stimulate healing. This procedure should be considered after three months in fracture with minimal callus. Median time for dynamization was 13.89 weeks in the present series which is comparable with that of the series reported by Ekeland (13 weeks).

The fracture is considered to have united if the patient is able to bear full weight without pain at fracture site and if radiograph shows callus bridging at the fracture site or obliteration of fracture line [4]. The median union time of the present series was 16.56 weeks which is almost similar to that of series reported by Ekeland (16 weeks). The majority of the patients were returned to same work with average period of 17.91 weeks, in the present series while in Ekeland series time was 12 weeks and in P.A. Blachut series, it was 16 weeks.

The results of operated fracture tibia fibula with interlocking nail were classified as excellent, good, fair and poor according to the criteria devised by Ekeland. In the present series, 94% of the patients had excellent to good results which is similar to Ekeland series (94%). Two patients had fair results and one patient had poor result. Case no. 1 had deep infection which led to chronic osteomyelitis and poor result. Patient started premature weight bearing leading to bending of proximal screw, he did not cooperate in physiotherapy and had stiffness of knee and ankle joint.

Majority of the patients (96%) were happy with end result.

Conclusion

Though the series is relatively small, it appears that reamed Intramedullary interlocking nailing is good, effective and safe method of treatment for closed and open grade I, fractures and also comminuted, unstable tibial diaphyseal fracture located within 7 cm below the knee joint and 5 cm above the ankle joint.

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