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The incidence of fractures in the tibial shaft that do not heal properly despite the use of locking plates.A case series study.

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Abstract **Original Research Article**

INTRODUCTION:
Fractures of the tibia are often the consequence of accidents and falls. Treatment for an open fracture Tibia is a challenging issue for both orthopaedic and plastic surgeons. There are several treatment options available for tibia fractures, including conservative and surgical procedures. Locking plates are a successful therapeutic approach, however they have problems including nonunion..

OBJECTIVE:

The purpose of this study is to determine the frequency of nonunion in tibial shaft locking plates..

MATERIALS AND METHODS:
All patients hospitalized to our department with tibial shaft fractures who consented to participate were included in this research. Context for Conducting a Case Study The study was conducted at Department of Orthopedic DHQ Hospital Batkhala Pakistan . The Period of Study Sixty month (16 Aug, 2020 - 15 Feb, 2021) It was determined that the fracture needed to be stabilised, and a locking compression plate was used. Patients were contacted on a frequent basis utilising their contact information in order to lessen the risk of them not following up. The 24th week visit for non-union was conducted using X-rays of the tibia shaft Antero-posterior and lateral views as the final evaluation for the research. The patient was instructed to notify the hospital immediately if any complications emerged from the surgery. when returning to the surgical location for follow-up appointments All surgical operations were subjected to periodic radiological and clinical evaluation.

RESULTS:
The study included 156 patients in total. In 15 patients, there was a nonunion (9.6 percent). There was no statistically significant relationship between nonunion and gender, patient age, or fracture type.

CONLCUSION:
The nonunion rate in our study was 9.6 percent. According to our clinical findings, the single lateral approach technique for TSF with locking plate takes less time to perform, requires less hospitalisation time, and has a lower risk of nonunion.

KEYWORDS: Tibial fracture, Locking, Compression Plate, Minimally Invasive Plate

INTRODUCTION

Long lower-extremity bone. 1 Because the tibia is shallow, fractures are common1. Accidents and falls cause tibial fractures1. Rising population and changing human behaviours increase accidents and high-energy trauma. Orthopaedic and plastic surgeons struggle with open tibia fractures. 2 Open tibial fractures may be treated with irrigation, external fixation, debridement, intramedullary nailing, and plating. Because conservative therapy often leads in malunion, nonunion, rotational deformity, or joint stiffness, operational treatment has become increasingly common. 3-4-5 Surgically treating these fractures is debatable. 5 Options include intramedullary implants, half-pin external fixation, hybrid or thin-wire external fixation, and plate fixation. Other treatments can fix tibial fractures. Plates, k-nails, and external fixation1 are examples. 6 Therapeutic options for distal tibial fractures include locked plating. Anatomical plating enables for optimum reduction, but high fracture energy and soft tissue damage make big incisions inappropriate. Percutaneous plating for tiny wounds and soft tissue injury has improved. 7 In certain studies, tibial plating has problems such non-union, implant failure, wound infections, and joint stiffness. 8-9 A single-surgeon research comparing minimally invasive plating with intramedullary nailing reported nonunion rates of 8% and 7%, respectively. After a year of follow-up, 11% of patients with tibial fractures had non-union, with the average incidence ranging from 9% to 22%. 10-11 The Ilizarov procedure treats tibial shaft fractures. It's connected to a clunky ring that causes patient suffering. Locked plating increases the likelihood of non-union for such fractures. Locked plates are used for tibial fractures. My study seeks to increase fracture union, reduce post-operative complications, and improve patient satisfaction via quicker healing and shorter hospital stays. This study will determine the dangers of locked plating, especially fracture non-union, in our patient group. 12-13 The literature uses higher-quality implants, which are not accessible here. If nonunion is common, this research will be utilised to improve ward and surgical recommendations. 14 This research will enhance orthopaedic physicians' awareness of nonunion and offer surgical method modifications.

Fig No. 1 Radiograph demonstrating a displaced tibial shaft fracture with associated fibula fracture.
Fig No. 2 Open tibial shaft fracture.
(Fig 01) (Fig 02)

Figure 03: External fixation of an open tibial shaft fracture . Note the fasciotomy incision on the left leg's lateral side.
Figure 04: Anterior-posterior radiograph of a tibial shaft fracture with intramedullary nail fixation. Also seen is the usually accompanied ibularfracture. (Fig 03) (Fig 04)

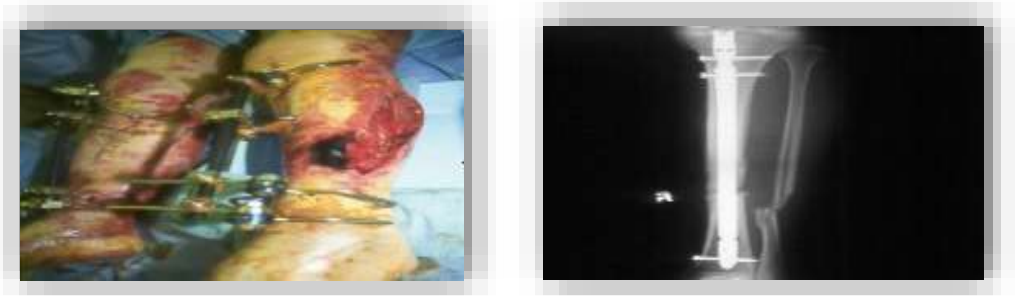

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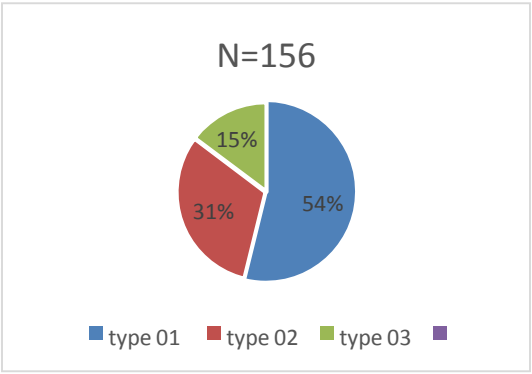
Figure no 05 Open Tibia Fractures
Figure no 06 type of patients included in this study

(Fig 05)

(Fig 06)



DATA ANALYSIS PROCEDURE

The collected data was entered into computer using SPSS version 2.4 for analysis. Descriptive statistics was used to calculate means ± standard deviation for numerical variables i.e. age. For categorical variables like gender, type of fractures and non union, frequencies and percentages was calculated. Non union was stratified among the age, gender and AO type to see the effect modification. Chi-square test was used to assess for any significant difference between categorical variables. P-value ≤ 0.05, was considered statistically significant. All results was presented in the form of tables and figures.

PHYSICAL EXAMINATION

All people who have been in a high-energy accident should be examined according to the guidelines set out by the Royal Australasian College of Surgeons' Road Trauma Committee/Emergency Management of Severe Trauma.The ABCs are included in the primary survey (ie, airway, breathing, circulation). The severity of any head injury component is determined by the Glasgow Coma Scale (GCS) score.For associated injuries, the secondary survey should include the chest, abdomen, and pelvis, as well as the upper limbs and contralateral lower limb. Other fractures, such as a femur fracture leading to a floating knee, or joint injuries, such as knee dislocations, may also affect the ipsilateral limb. If the mechanism of injury (e.g., a pedestrian hit by a car) suggests it, look for signs of crush injury. External signs of these injuries may be minimal.

COMPLICATIONS

When the pressure within a certain fascial compartment of the leg is increased to the degree that it might induce blood flow restriction and nerve injury, compartment syndrome is a complication that every doctor treating a tibial shaft fracture should be worried about. The clinician does not need to witness all of the symptoms in order to diagnos

syndrome. A strong index of suspicion and vigorous surgical therapy are necessary for this condition. Reduced pulses may not become apparent until much later in the procedure, so keep this in mind at all times. Pressure monitors are now often recommended by surgeons as a tool for patients to consider while making treatment choices. More than 25-30 mm Hg of compartment pressure is cause for worry and should be brought up with a physician. The treatment for compartment syndrome is fasciotomy.

MANAGEMENT FRACTURE REPAIR

Intramedullary nailing is the best choice for Gustilo-Anderson fractures of type I, II, and III. Type IIIB fractures may be treated with unreamed nails as well. Solid-core nails have the lowest incidence of infection. According to Marecek et al, individualswith open tibia fractures who had medullary nailing ofthe tibia by suprapatellar or infrapatellar methods had identical risks of developing knee sepsis.

APPROACH CONSIDERATIONS

Routine preoperative blood tests are ordered. Routine limb, chest, and cervical spine radiographs are ordered.

DISCUSSION

Lower leg bone tibia. Surface tibial fractures areprevalent. 15. Accidents and falls cause most tibial fractures. 1. As the population expands and habits change,accidents and high-energy trauma rise. 16 Orthopaedic and plastic surgeons must manage open tibia fractures. 17Open tibial fractures may be treated with irrigation, external fixation, debridement, intramedullary nailing, and plating. 18 Conservative treatment of these fractures often results in malunion, nonunion, rotational deformity,or stiffness of neighbouring joints, hence surgery therapy is now preferred. The optimal surgery for these fractures is uncertain. questionable. Intramedullary implants, half-pin, hybrid, or thin-wire external fixation, or plate fixation are alternatives. 19-20

There are several tibial fracture treatments. Placing, k-nail, and external fixation are examples. 21 Locked plating is more prevalent for distal tibial fractures. High-energy fractures and injured soft tissue render big incisions unsuitable for reduction, even anatomical plating. Minimally invasive percutaneous plating seeks tiny incisions and little soft tissue damage. 22

Despite being the recommended therapy, tibial plating may cause non-union, implant failure, wound infections, and joint stiffness. A single-surgeon research comparing minimally invasive plating to intramedullary nailing reported a nonunion rate of 8% for plating and 7% for nailing5, but in our analysis, 15.6% of patients suffered nonunion. Table 5

In another research, 11% of tibial fracture patients suffered non-union after a year of follow-up, with the average incidence ranging from 9 to 22% 6; in our study, 15.6% of patients experienced non-union. Table 5

Ilizarov method treats tibial shaft fractures. Heavy ring increases patient pain. Locked plating for such fractures increases non-union rates. We've started employing locking tibial plates. My research intends to evaluate whether it increases fracture union frequency, post-op complications, and patient satisfaction due to rapid healing and a shorter hospital stay. 23 This study will determine locking plating problems, including fracture nonunion in our patient group. Literature data is based on higher-quality implants, which are not accessible in the U.S. If nonunion is common, this research will be utilised to improve ward and surgical recommendations. 24 This research will educate orthopaedic surgeons about nonunion prevalence and give surgical procedure suggestions.

RESULTS

156 patients are included. Peshawar's Khyber Teaching Hospital Orthopedics. Mean and SD for Age were 39 + 12.68. Information is in Table 1. 27 (17.30%) patients were in the 16-30 Years Age Group, 57 (36.53%) in the 31-45 Years Age Group, and 72 (46.15%) in the 46-50 Years Age Group (Table No. 2).

In Gender Wise Distribution, 58 patients (37.17%) were females and 98 (62.82%) were men. Information is in Table 3. Similarly, 84 patients (53.84%) had Type A fractures and 49 (31.41%) had Type B fractures. 23 (14.74%) patients had type C fractures. Table 4 According to frequencies and percentages, 15.9% of patients had nonunion. Table 5 Tables 6, 7, and 8 demonstrate nonunion by gender, age, and fracture type.

Table No 01: DESCRIPTIVE STATISTICS

(n=156)

Mean and SD for Age	39 Years ± 12.68

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Table No. 02 FREQUENCY AND PERCENTAGES FOR AGE

(n=156)

Age Group	Frequency	Percentage
16-30 Years	27	17.30%
31-45 Years	57	36.53%
46-50 Years	72	46.15%

Table No. 3 FREQUENCY AND PERCENTAGES FOR GENDER

(n=156)

Gender	Frequency	Percentage
Female	58	37.17%
Male	98	62.82%

Table No. 4 FREQUENICIES AND PERCENTAGES FOR TYPE OF FRACTURE

(n=156)

Type of Fracture	Frequency	Percentage
Type A	84	53.84%
Type B	49	31.41%
Type C	23	14.74%

Table No. 5 FREQUENICIES AND PERCENTAGES FOR NON UNION

(n=156)

Non Union	Frequency	Percentage
Yes	15	9.61%
No	141	90.38%

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Table No. 6 STRATIFICATION OF NON UNION WITH TYPE OF FRACTURE

(n=156)

Type of Fracture	Non Union	Frequency	Percentage	P Value
Type A	Yes	09	5.76%	
	No	75	48.07%	
Type B	Yes	04	2.56%	
	No	45	28.84%	**0.878**
Type C	Yes	02	1.28%	
	No	**21**	**13.46%**	

CONCLUSION

We Found 15 (9.61%) Nonunions In Tibial Shaft Fracture Locking Plates During Our Investigation. According To Our Clinical Follow-Up, Soft Tissue Problems Must Be Kept In Mind.TSF Surgery With A Single Lateral Approach And Locking Plate Takes Less Time And Requires Less Time In The Hospital.

REFERENCES

1. Bell A, Templeman D, Weinlein JC. Nonunion of the Femur andTibia: An Update. Orthop Clin North Am. 2018;47(2):365–75..

2. Ahmed N, Khan MS, Afridi SZ, Awan AS, Afridi SK, Sultan S, et al. Efficacy and safety of interlocked intramedullarynailing for open fracture shaft of tibia. J Ayub Med Coll Abbottabad. 2018;28(2):341-4.

3. Meena RC, Meena UK, Gupta GL, Gahlot N, Gaba S. Intramedullary nailing versus proximal plating in the management of closed extra-articular proximal tibial fracture: a randomized controlled trial. J Orthopaed Traumatol. 2019;16:203–8

4. Seyhan M, UnayK, Sene M. Intramedullary nailing versus percutaneous locked plating of distal extra-articular tibial fractures: a retrospective study. Eu J Orthopaed

Surg Traumatol. 2019 July;23(5):595-601.

5. Eric BDO, Cory CA. Metaphyseal distal tibia fractures: a cohort, single-surgeon study comparing outcomes of patients treated with minimally invasive plating versus intramedullary nailing. J Orthopaed traum. 2015 May;30(5):e169-74
6. Lee MH, Hsu CJ, Lin KC, Renn JH. Comparison of outcome of unilateral locking plate and dual plating in the treatment of bicondylar tibial plateau fractures. J Orthopaed Surg Res. 2015;**9**:62.
7. Alho A, Benterud JG, Hogevold HE, et al. Comparison of functional bracing and locked intramedullary nailing in the treatment of displaced tibial shaft fractures. *Clin Orthop*. 1992 Apr. (277):243-50.
8. Court-Brown CM, McBirnie J. The epidemiology of tibial fractures. *J Bone Joint Surg Br*. 2015 May. 77(3):417-21.
9. Milner SA, Davis TR, Muir KR, et al. Long-term outcome after tibial shaft fracture: is malunion important?. *J Bone Joint Surg Am*. 2002 Jun. 84-A(6):971-80.
10. Vallier HA, Cureton BA, Patterson BM. Factors Influencing Functional Outcomes After Distal Tibia Shaft Fractures. *JOrthop Trauma*. 2011 Dec 22.
11. Connelly CL, Bucknall V, Jenkins PJ, Court-Brown CM, McQueen MM, Biant LC. Outcome at 12 to 22 years of 1502 tibial shaft fractures. *Bone Joint J*. 2014 Oct. 96-B(10):1370-7.
12. Heyworth BE, Green DW. Lower extremity stress fractures in pediatric and adolescent athletes. *Curr Opin Pediatr*. 2008 Feb. 20(1):58-61.
13. Blick SS, Brumback RJ, Lakatos R, et al. Early prophylactic bone grafting of high-energy tibial fractures. *Clin Orthop*. 1989 Mar. (240):21-41.

14. Court-Brown CM, McQueen MM, Quaba AA, Christie J. Locked intramedullary nailing of open tibial fractures. *J Bone Joint Surg Br*. 1991 Nov. 73(6):959-64.

15. Court-Brown CM, Wheelwright EF, Christie J, McQueen MM. External fixation for type III open tibial fractures. *J Bone Joint Surg Br*. 1990 Sep. 72(5):801-4.

16. Schandelmaier P, Krettek C, Rudolf J, et al. Superior results of tibial roddingversus external fixation in grade 3B fractures. *Clin Orthop*. 1997 Sep. (342):164-72. Tornetta P 3rd, Bergman M, Watnik N, et al. Treatment of grade- IIIb open tibial fractures. A prospective randomised comparison of externalfixation and non-reamed locked nailing. *JBone Joint Surg Br*. 1994 Jan. 76(1):13- 9.

17. Whittle AP, Russell TA, Taylor JC,Lavelle DG. Treatment of open fractures of the tibial shaft with the use of interlocking nailing without reaming. *J Bone Joint Surg Am*. 1992 Sep. 74(8):1162-71.

18. Gustilo RB, Anderson JT. Prevention of infection in the treatment of one thousand and twenty- five open fractures of long bones: retrospective and prospective analyses. *J Bone Joint Surg Am*. 1976 Jun. 58(4):453-8.

19. Müller ME, Nazarian S, Koch P. *The Comprehensive Classification of Fractures of Long Bones*. Berlin: Springer-Verlag; 1990.

20. Fracture and Dislocation Classification Compendium - 2007 OrthopaedicTrauma Association/Classification, Database & Outcomes Committee. Orthopaedic Trauma Association. Available at http://ota.org/research/fracture-and-dislocation-compendium/. Accessed: June 10, 2016.

21. Littenberg B, Weinstein LP, McCarren M, et al. Closed fractures of the tibial shaft. A meta-analysis of three methods of

treatment. *J Bone Joint Surg Am*. 1998 Feb. 80(2):174-83.

22. Kindsfater K, Jonassen EA. Osteomyelitis in grade II and III open tibia fractures with late debridement. *J Orthop Trauma*. 1995 Apr. 9(2):121-7.

23. Kyro A, Tunturi T, Soukka A.Conservative treatment of tibial fractures.Results in a series of 163 patients. *Ann ChirGynaecol*. 1991. 80(3):294-300.

24. Kindsfater K, Jonassen EA. Osteomyelitis in grade II and III open tibia fractures with late debridement. *J Orthop Trauma*. 1995 Apr. 9(2):121-7.