

ROLE OF LOW PROFILE PRECONTOURED DISTAL TIBIAL LOCKING PLATE USING MIPPO TECHNIQUE IN PILON FRACTUREIsaac Sunder Sen¹**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Tibial pilon fracture – Spectrum of injury ranging from fractures caused by low energy rotational foci to fractures caused by high energy axial compression forces due to RTA/ fall from height with significant metaphyseal comminution articular comminution with diaphyseal extension. Almost 80% patients will have fibula fracture. The aim of the study is study the efficacy of LP PD DTP in the management of closed pilon fractures (OTA type A Type B and Type C 1) and open pilon fractures (Grade 1 Grade II Grade III A) (Gustilo Anterson grading). 1. I have studied 21 patients of pilon fracture classified using AO/OTA classification Type A-metaphyseal; Type B-Partially articular; Type C Metaphyseal fracture with articular involvement. 2. Used LP/ PC/ Distal tibial plate using MIPPO technique in OTA-A, B and C 1 closed & grade I II Grade III A compound fractures.

OBSERVATIONS: 1. In contrary to stages protocol (1st external fixation with fibular plating after 2-3 Weeks ORIF/MIPPO with/Without bone grafting), it is done percutaneously or minimally invasive and it can be done on day 1 without any major soft tissue problem & post-operative infection. 2. Duration of stay in the hospital can be reduced. 3. Since it is done through calcaneal traction or femoral distractor – fibula length restored & plating may not be necessary all the time and fibula plating can be avoid if the soft tissue condition is not favorable for plating laterally. 4. Since it is done through calcaneal traction/femoral distractor inspite of ground glass comminution–good reduction is almost always possible. 5. Since MIPPO–need for bone grafting in less. 6. As in staged protocol more time is spent in soft tissue healing and after 2–3 weeks, fractures reduction if difficult and almost impossible with indirect reduction and may warrant open reduction. I conclude that LP PC distal tibial plate using MIPPO technique offers several advantages over two staged protocol and improved the current treatment of pilon fracture management.

KEYWORDS: Pilon Fracture–MIPPO–LP PD TP.

INTRODUCTION: Tibial pilon fracture – Spectrum of injury ranging from fractures caused by low energy rotational foci to fractures caused high energy axial compression forces due to RTA/fall from height with significant metaphyseal comminution articular comminution with diaphyseal extension.

MATERIAL & METHODS: I present my 2 years' experience with the management of pilon fractures with low profile precontoured distal tibial plate using MIPPO technique. This retrospective study was done at Dr. ISAAC Bone & joint speciality hospital, Marthandam, Kanyakumari Dist from June 2008 to June 2010.

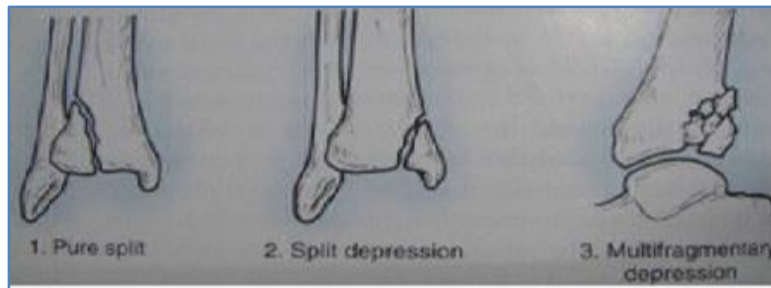
All patients with acute pilon fracture treated by LP PC DTP using MIPPO technique were included in the study.

All pilon fracture were classified Using OTA classification:

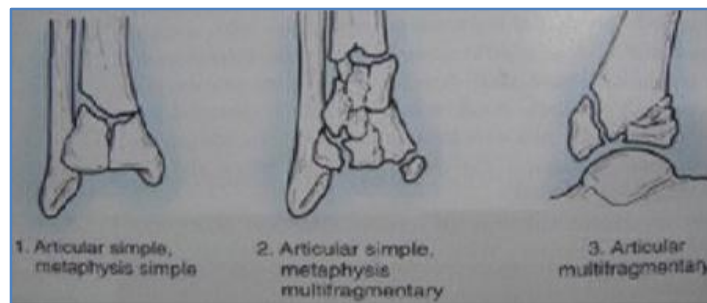
Type A - Metaphyseal $\begin{matrix} 1 \\ 2 \\ 3 \end{matrix} \rightarrow$ According to communiton



B-Partially IA $\begin{matrix} 1 \\ 2 \\ 3 \end{matrix} \rightarrow$ According to communiton



C-Metaphyseal & Completely $\begin{matrix} 1 \\ 2 \\ 3 \end{matrix} \rightarrow$ According to communiton



SELECTION CRITERIAS:

1. Closed (OTA - Type A, B and Type C1) & compound (Grade I II and grade III A) pilon fracture.
2. Able to seek medical attention with in 3 to 6 hours of injury.
3. Medically optimized in consultation with internal medicine specialist.
4. Good vascular and neurological status of operating limb.
5. Good pre injury level of function.

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EXCLUSION CRITERIAS:

1. Grade III B & C compound fractures.
2. OTA - Type C II & III closed fractures.
3. After 6 hours of post injury.
4. Medically not optimized due to co - morbidity.
5. Poor neuro vascular status due to peripheral neuropathy or vasculopathy.
6. Pre injury status - not ambulant.
7. Open fractures with gun short / farmyard etc.

PROCEDURE: With the patient under SA in Supine position with a Sand bag under the affected leg & ankle with a calcaneal traction the limb is separately draped. Both AP & lateral views checked ↓ C - arm for anatomical reduction. Only after good reduction a small vertical incision about 3 cm length was made well below medial malleolus (Entry Portal) to slide the plate in.

With periosteal elevator - tunnel was created over medial aspect of lower tibia. Then through the tunnel LP\PC\DTP was introduced and checked ↓ C -arm for proper placement of plate over medial aspect of tibia. Both ends of plates were temporally fixed with k wire & checked ↓ C- arm.

Screws were introduced on either ends of plate through predrilled holes using properly angled sleeves using stab incision. Middle cortical screw introduced, and then remaining screw was passed using sleeves one by one. Throughout the procedure both views of C- arm were used to confirm the proper seating of plate & maintenance of fragment reduction.



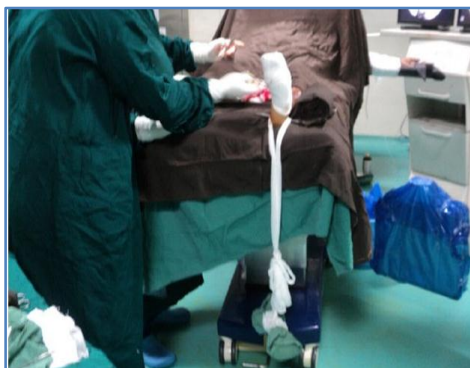
Skin mini incision & stab incision closed in layers. IV antibiotics used for 48hours. No POP slab was given post operative. Active SLR, knee, ankle and toe movements were encouraged from day one according to patient's pain tolerance. On 5th post operative day majority of patients were discharged. All patients were regularly followed up weakly once for 4week biweekly for another 8weeks. Toe touch weight bearing started after 8weeks and complete weight bearing after 10weeks with the radiological evidence of union:

- Fibula plating was not done routinely.

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- No Bone grafting added.
- Need for open reduction did not arise since with calcaneal traction able to reduce the fractures satisfactorily.

The functional outcome was assessed clinically and radiologically and graded as excellent good & poor.





RESULT:

Excellent:

- Full ankle movements.
- No Infection.
- No Pain.
- Radiological healing within 12weeks' time.

Good:

- Radiological healing within 16 weeks.
- Mild restriction of ankle movements (10° DF 10° PF).

Poor:

- Ankle stiffness.
- Delayed healing after 16 weeks.
- Plate exposure.
- Implant failure - plate breakage.
- Post-operative loss of reduction and nonunion.

A FOLLOW UP OF > 2 YEARS AVAILABLE IN 21 PATIENTS.

(OTA grade C3)



Pre-operative



Post-operative

18yrs (OTA Grade C 1)



Pre-operative



Post-operative

65yrs, (OTA Grade A 3)



Pre-operative



Post-operative

Age: 51yrs (OTA Grade C 1)



Pre-operative



Post-operative

Age: 55yrs, (OTA Grade C 1)

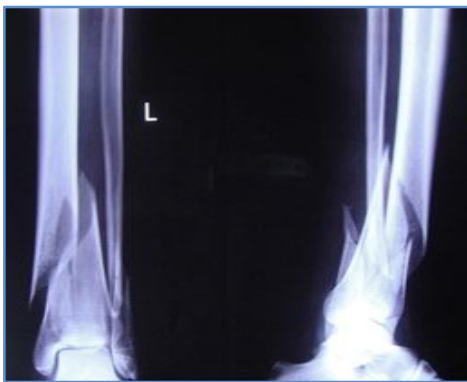


Pre-operative



Post-operative

Age: 53yrs (OTA Grade C 1)



- Good result in 3 patients.
- Poor result in 3 patients.

POOR RESULT:

1. One patient lost reduction post operatively and led to Septic nonunion - purely due to Co-morbid medical illnesses and poor patient compliances/Reosteosynthesis with Bone Grafting and external fixator application done.
2. Failed to address metaphyseal defect with bone graft resulted in implant failure → Reosteosynthesis with bone grafting done and ILIM nailing done.
3. Entry site plate exposed - plate was removed after union.
4. No case required bone grafting except 2 cases.
5. No Postoperative wound infection except one entry site plate exposure that again due to poor operative techniques.
6. Persistent fracture site pain was noted in 2 patients for a period of 16 weeks with Subsequent fracture healing pain disappeared.

DISCUSSION:

- LP PC DTP using MIPPO technique could be performed successfully in all Type A B & C1 closed pilon fractures and grade I Grade II and III A open pilon fractures.
- Mini incision at plate entry site became a micro incision with more experience.
- Operative time reduced gradually from 2 hours to 45 minutes with more experience.
- Difficulties were experienced in few initial cases especially in fractures reduction proper medial plate placement and good bicortical screw purchase:
 1. In contrary to staged protocol (1st external fixation with fibular plating after 2 – 3 weeks ORIF/MIPPO with/without bone grafting), it is done percutaneously or minimally invasive and it can be done on day 1 without major soft tissue problem & post-operative infection → (Duration of stay in the hospital can be reduced)
 2. Since it is done through calcaneal traction or femoral distractor→ fibula length restored & plating may not be necessary.
 3. Since it is done through calcaneal traction/femoral distractor inspite of ground glass comminution – good reduction possible.
 4. Since MIPPO – need for bone grafting is less. Even if needed also can be done through stab incision.
 5. As in staged protocol more time is spent in soft tissue healing and after 2 – 3 weeks, fracture reduction is difficult and almost impossible with indirect Reduction may warrant open reduction.

CONCLUSION: LP/PC/DTP using MIPPO technique is an ideal method of treatment in both closed and grade I II & III a compound pilon fractures.

With good surgical technique a good outcome can be expected this is related to experience with improvement in surgical technique.

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