

MIPO

■ ■ ■

가

< >
 : (minimally invasive plate
 osteosynthesis:MIPO)
 .
 : 1997 1 2000 2 (AO , A2, A3, C1, C2, C3
) 18 .
 MIPO
 , Rasmussen ,
 가 12
 : 51 (30-80), 10.7 (9-14)
 5 6 , 5 1 , 11
 . 0 140 13 , 0-120 3 , 0 90 2 . Rasmussen
 가 14 (77.8%), 4 (22.2%), 가 7
 (38.9%), 11 (61.1%) 18
 : MIPO 가
 ,
 : , MIPO .

$$\vdots$$

1198

가

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가 VI , AO
C1 (1), C2 (8), C3 (1) (table 1).
가 13 , 가 5
(complex meta-epiphyseal fractures) 46.6 (19-69) , 5 ,
가 가 12 가 , 18
가 ,
AO
가
3,18) 가 2 ,
minimally invasive plate 2-5
osteosynthesis (MIPO) , 가
가
bolster
cannulated screw
5mm 가
1998 1 2000 2
MIPO
1 가가 18
MIPO :
MIPO
18
가 AO ¹¹⁾ A2 (1), A3 (7) 1 :
Schatzker ¹⁴⁾ Bolster

Table 1. Classification of the proximal tibia fractures by AO classification

classification	Number cases(%)
A2	1 (5.6%)
A3	7 (38.9%)
C1	1 (5.6%)
C2	8 (44.4%)
C3	1 (5.6%)
Total	18 (100%)

Table 2. Knee ROM

ROM*(degree)		Number of cases(%)
0	140 °	13 (72.2%)
0	120 °	3 (16.7%)
0	90 °	2 (11.1%)

*ROM : range of motion

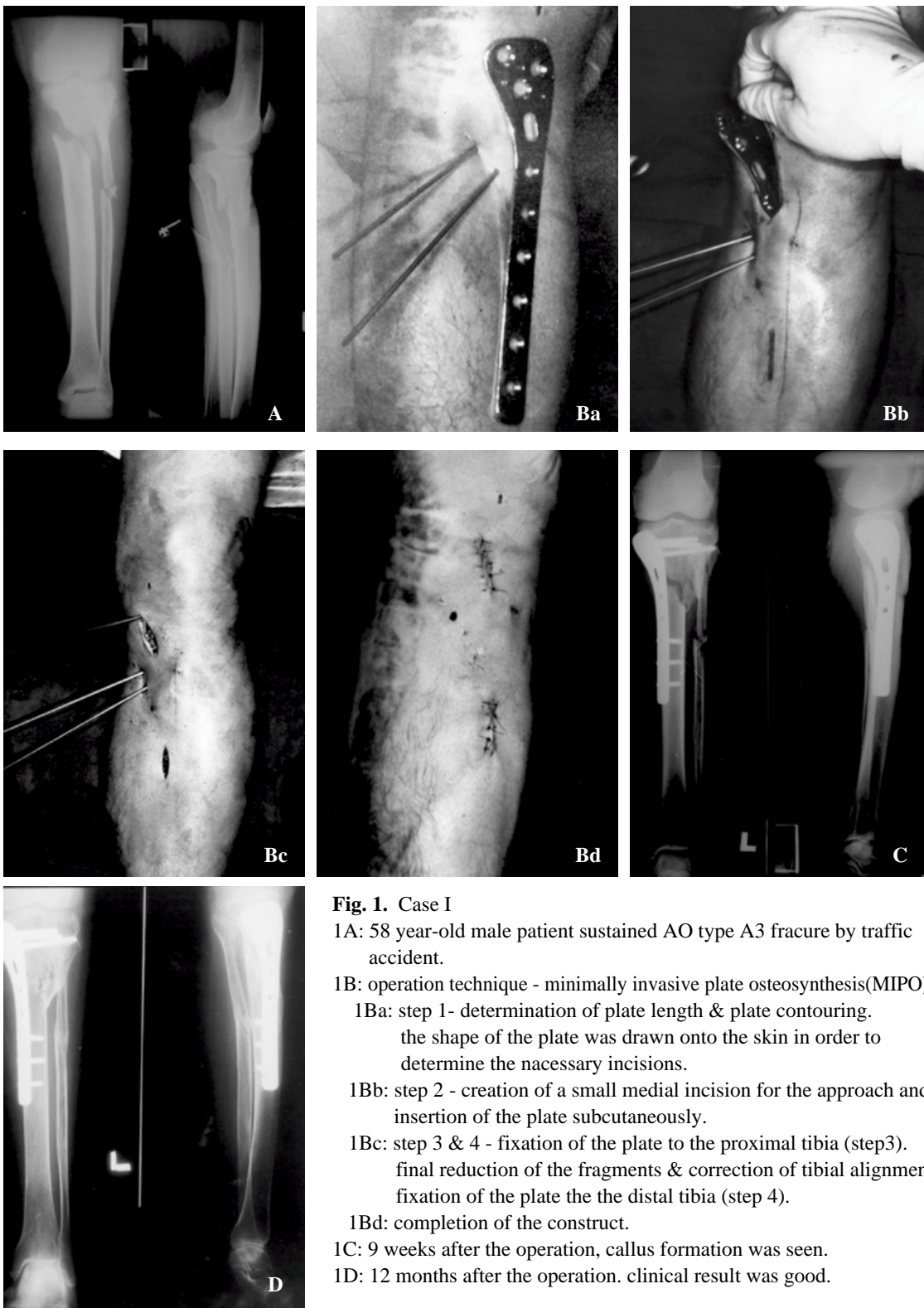


Fig. 1. Case I

1A: 58 year-old male patient sustained AO type A3 fracure by traffic accident.

1B: operation technique - minimally invasive plate osteosynthesis(MIPO).

1Ba: step 1- determination of plate length & plate contouring.
the shape of the plate was drawn onto the skin in order to determine the necessary incisions.

1Bb: step 2 - creation of a small medial incision for the approach and insertion of the plate subcutaneously.

1Bc: step 3 & 4 - fixation of the plate to the proximal tibia (step3).
final reduction of the fragments & correction of tibial alignment
fixation of the plate the the distal tibia (step 4).

1Bd: completion of the construct.

1C: 9 weeks after the operation, callus formation was seen.

1D: 12 months after the operation. clinical result was good.

, T L 4.5 mm
18.1 (12-
23)
가 3
2 :
(2~3 cm)
subcutaneous tunnel pes anserinus
가 K- (9-14)
0-12 °
0-90
K- 6.5 mm
(table 2).

Table 3. Radiologic alignment

T-F angle*	Number of cases
0 °	11 (61%)
0 ~ 5 ° valgus	6 (33.3%)
6 ~ 10 ° valgus	1 (5.6%)

* Tibiofemoral angle

Table 4. Complications

Complication	Number of cases
Soft tissue infection	-
Joint infection	-
Non union	-
Metal failure	-
Joint instability	1
MCL* irritation	
due to plate	1
acceptable Valgus (5 °)	6
unacceptable Valgus (> 5 °)	1

* : medial collateral ligament

4 :
3 4
1
1
가
Rasmussen 가 13)

Table 8. operation time

operation time (mim)	Number of cases
30 - 40	5
40 - 50	8
50 - 70	4
70	1
average : 51 mim	

functional	results	Number of cases (%)	anatomical results	Number of cases (%)
excellent		14 (78 %)	excellent	7 (38.9 %)
good		4 (22.2%)	good	11 (61.1 %)
fair		-	fair	-
poor		-	poor	-

: , , 3,4,15,18)
 1 1 AO
 ,
 가 1 , 6 가
 , 5 1 (Table 4).
 Rasmussen 가: Rasmussen ,
 13) 가 14 가
 77.8%), 4 (22.2%), 가 39,15,18)
 (38.9%), 11 (61.1%) 18 ,
 (Table7). 가
 1,10,12)
 MIPO ,
 ,
 8)
 ,
 hybride
 17) , 가
 . MIPO 1990

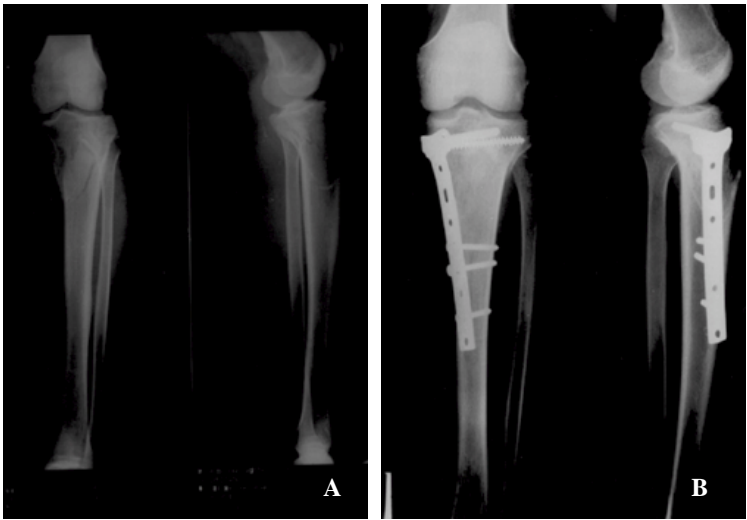


Fig 2. Case II
2A: 40 year-old male patient sustained AO type C2 fracture
2B: 12 weeks after the operation, bony union was achieved. and clinical result was excellent.

AO LISS)

가

Krettek

2,3,5-7)

MIPO T L 4.5 mm

LISS

가

ligamentotaxis, bridge plating

ligamentotaxis

가

5-7)

Krettek 6,16) 6 MIPO

3

MIPO

가

가

18

(Fulcrum)

가

MIPO

(Table 8),

3 MIPO

(angular stabilization system for plate :

가

가

18

MIPO

MIPO

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Abstract

Treatment of Comminuted Fractures of Proximal Tibia using MIPO technique

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Purpose: To evaluate the advantages of fixation of metaphysis by minimally invasive plate osteosynthesis(MIPO) technique for comminuted fractures of the proximal tibia.

Materials & Methods: from January 1997 to February 2000, 18 cases of comminuted fracture of the proximal tibia were treated using MIPO technique. Operation time, union time, radiologic alignment, range of motion of the knee joint, functional and anatomical results according to Rassmusen 's grading criteria, complications were evaluated. Minimal follow-up time was 12 months.

Results: Operation time was average 51 minutes (30-80 minutes). Time to bone healing was average 10.6 weeks (9-14 weeks) There was 1 case of valgus angular deformity greater than 5 degrees. 6 cases in acceptable bony alignment less than valgus 5 degrees and 11 cases were classified into normal bony alignment. Range of motion of the knee joint was 0-140 degrees in 13 cases, 0-120 degrees in 3 cases, 0-90 degrees in 1 case, 10-90 degree in 1 case. Rasmussen 's grading criteria for functional outcome revealed there were 14 cases(77.8%) excellent results, 4 cases(22.2%) good result. and grading criteria for anatomical outcome revealed there were 7 cases(38.9%) excellent results, 11 cases(61.1%) good result.

Conclusion: MIPO technique for comminuted fracture of the proximal tibia seems to be a good techinque to obtain more rapid bony union with less complication.

Key words : proximal tibia, comminuted fracture, MIPO.

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