

(LD-DCP)

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< >

:

: 1998 8 2001 8
43 1 가 38 . 23
, 15

: Robinson 1 12
(52.1%), 2a 11 (47.8%), 1 4 (26.7%),
2a 8 (53.4%), 2c 3 (20.0%)
16.2 , 12.3 Klemm
가 18 (78.2%),
가 13 (86.6%)
10
:

: , ,

:

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(,) 23 , 18
(78.2%) , 5 (21.8%)

(,) 15 , 10 (66.7%) narrow LC-DCP , 5 (33.3%) broad LC-DCP

15 , 8 ,
40.9 (21-66) . 37
(:21-60), 48 (:28-66)
7 , 8
53.2 (:42-72) , 41.1
(:14-61), 53.2 (:42-73)

Ilizarov .

38 가
28 (73.7%) 가 , 가 8
(21.0%), 가 2 (5.2%)
2 (8.9%)

⁵⁾ AO group , Gustilo 1 . 1 ,
(DCP) 1 (6.6%) , Gustilo I
(LC-DCP) ,

38 2
1 가 30 ,
1 2 가 8 . 1 2

⁸⁾ .

18 (78.2%),
5 (21.7%) ,
19 (82.6%) 2 , 4 (17.3%) 1
22
(95.6%), 14 (93.3%)

15
4
2 .

1998 08 2001 8 12 .
1 , 4 가
가 38
7.5 (:6-8)

Table 1. Functional classification (Klemm & Borner)

RESULT		IM nailing	LC-DCP
Excellent	Full knee and ankle motion	10 (43.4%)	8 (53.3%)
	No muscle atrophy		
	Normal radiographic alignment		
Good	Slight loss of knee or ankle motion	8 (34.7%)	5(33.3%)
	Less than 2cm of muscle atrophy		
	Angular deformity less than 5 °		
Fair	Moderate loss of knee or ankle motion	4 (17.3%)	2 (13.3%)
	More than 2cm muscle atrophy		
	Angular deformity 5-10 °		
Poor	Marked loss of knee or ankle motion	1(4.3%)	0
	Marked muscle atrophy		
	Angular deformity greater than 10 °		

Gustilo-Anderson³⁾

Tscherne¹⁴⁾

1.

Klemm 가 (Table 1.)

18 (78.2%))

13 (86.6%)

Klemm & Borner⁷⁾ 가

2.

20 (86.9%), 1 (4.3%),

2 (8.6%)

11 (73.3%), 3 (20%), 1 (7.7%)

. Robinson

1 12 (52.1%), 2a 11 (47.8%)

1 7 (46.7%), 2a 5

(33.3%), 2b 2 (13.3%), 2c 1 (6.7%)

가

6.9cm (:3.9-8.2cm),

4.2cm (:0-8.9cm)

16 (: 13-

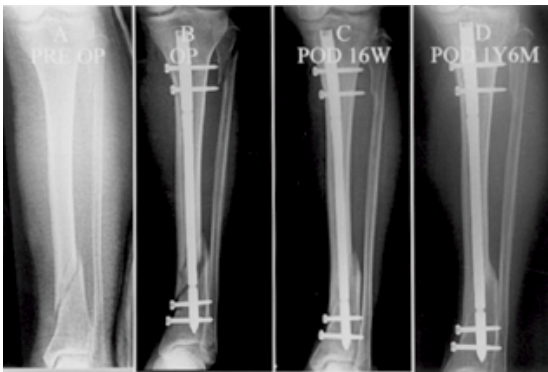
5

10mm

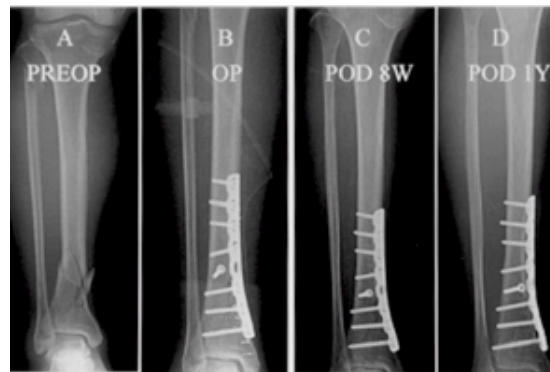
20) 20 (86.9%)

12 (: 10-16) 15 (100%)

Robinson¹²⁾(type I=AO type 43A1, 43A2, or 43A3, type IIa=AO type 43A1.1, IIb and IIc=AO type 43A2.3 or 43A3.3)

**Fig 1**

- A. 42-year old male radiograph showing distal tibia spiral fracture 4cm above ankle joint.
 B. Unreamed IM nailing was done at 2 days after injury.
 C. Bone union was not obtained in postoperative 16 weeks.
 D. Bone union was obtained in postoperative 1 year.

**Fig 2**

- A. 62-year old female radiograph showing distal tibia comminuted fracture.
 B. Anatomical reduction and internal fixation using narrow LC-DCP was done at 9 days after injury.
 C. Reduction is maintained well but not shows solid bony union at postoperative 8 weeks.
 D. Postoperative 1 year film reveals complete bony union.

3. 6 2
 1 10
 8 , 1 15
 , 10 (Fig 1-B) 4
 16 (Fig 1-C),
 1 6 (Fig 1-D)
 Klemm Borner⁷⁾ 가
 12 . Broad LD-DCP
 2 가 가
 가 , 7
 . Narrow LC-DCP
 (Fig 2-A) 9
 (Fig 2-B) 14
 8 (Fig
 2-C) 1 6 Klemm Borner⁷⁾
 가 .
 I
 55
 4cm (Fig1-A) 가 가 ,

1998 8 2001 8 23
15
가 ,
가

REFERENCES

- 1) **Bone, L.B. and Johnson, K.D.:** Treatment of tibia fractures by reaming and intramedullary nailing. J Bone Joint Surg, 68A: 877-887, 1986.
- 2) **Gregory K, Borner R, Moed J, et al:** Intramedullary nailing of unstable diaphyseal fractures of the tibial with distal intraarticular involvement. J Orthop Trauma, 11(3): 200-205, 1997.
- 3) **Gustilo RB, Merkow RL and Templeman D:** Current concepts review : The management of open fractures. J Bone Joint Surg, 72A : 299-304, 1990.
- 4) **Johner R and Wrujs O :** Classification of tibial shaft fracture and correlation with results after rigid internal fixation. Clin Orthop, 178: 7-25, 1983.
- 5) **Im GI, Kim DY, Shin JH, Youn KS and Cho WH :** Comparative analysis of interlocking nail and anatomical plate in the treatment of distal tibial fracture. J of Korean Society of Fractures, 12: 632-637, 1999.
- 6) **Kessler SB, Hallfeldt KKJ, Perren SM and Schweiser L :** The effect of Reaming and Intramedullary Nailing on fracture healing. Clin Orthop, 212:18-25, 1986
- 7) **Klemm Kw and Borner M:** Interlocking nailing of complex fractures of the femur and tibia. Clin Orthop, 212:89-100, 1986.
- 8) **Lee BH, Ha SH and Kim SH:** Treatment of long bone fracture using LC-DCP. J of Korean Society of Fractures , 10 :37-43, 1997.
- 9) **Oni OOA, Hui A and Gregg PJ :** The healing of closed tibial shaft fracture natural history of union with closed treatment. J Bone Joint Surg(Br), 70-B: 787-790, 1988.
- 10) **Reichert ILH, McCarthy ID and Hugues SPF :** The acute vascular response to Intramedullary reaming. J Bone Joint Surg, 77b:490-493, 1995.
- 11) **Rezacz EH, Konneker W, Reilmann H and Culemann U:** Combination of intramedullary nsiling and covered screw osteosynthesis for managing distal tibial fractures with ankle joint involvement. Unfallchirurg, 102(12): 907-913, 1988.
- 12) **Robinson CM, McLauchlan GJ, McLean IP and Court-Brown CM:** Distal metaphyseal fracture of the tibia with minimal involvement of the ankle: Classification and treatment by locked intramedullary nailing. J Bone Joint Surg(Br), 77-B: 781-787, 1995.
- 13) **Schemitsch EH, Kowalski MJ, Swiontkoski MF and Senft D :** Cortical bone blood flow in Reamed and Unreamed locked Intramedullary nailing: A tracted tibia model in sheep. J Orthop Trauma, 8(5): 373-382, 1994.
- 14) **Tacherne H and Gotzen L:** Fracture with soft tissue injuries. Berlin, Springer Verlag : 5-9, 1984.
- 15) **Trafton PG. Tibial shaft fractures.** In: Browner BD, Jupiter JB, Levine AM, Trafton PG, eds. Skeletal trauma. Philadelphia, etc: W.B. Saunders, 1771-1871, 1992.
- 16) **Trueta J and Cavadias AX :** Vascular changes caused by the Kuntscher type of nailing & experimental study in the rabbit, J Bone Joint Surg, 37:13, 492, 1995.
- 17) **Yang KH, Han DY and Park SJ:** Intramedullary nailing in distal tibial metaphyseal fracture. J of Korean Society of Fractures, 35: 325-331, 2000.

Abstract

Comparative Analysis of Interlocking IM Nailing and LC-DCP fixation in the Treatment of Distal Tibial Fracture

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Purpose : To compare the clinical results between interlocking IM nailing and LC-DCP fixation in the treatment of distal tibial shaft fracture.

Materials and Methods : From August 1998 to August 2001, 23 patients were treated by interlocking IM nail and 15 patients were treated by LC-DCP for distal tibial shaft fracture.

Results : According to Robinson classification, there were 12 type 1 fractures (52.1%) and 11 type 2a fractures (47.8%) in the interlocking IM nailing group, and 4 type 1 fractures (26.7%), 8 type 2a fractures (53.4%) and 3 type 2c fractures (20.07%) in the LC-DCP fixation group. The average time to bony union was 16 weeks in the patients treated with interlocking IM nail and 12 weeks in the patients treated with LC-DCP. In the functional outcome (according to Klemm and Borner), 18 patients treated (78.2%) with interlocking IM nail showed satisfactory results and 13 patients (86.6%) treated with LC-DCP had satisfactory results.

Conclusion : We concluded that more satisfactory results could be obtained with LC-DCP fixation compared with interlocking IM nailing in the treatment of the distal tibial fracture.

Key Words : Distal tibial fracture, Interlocking IM nail, LC-DCP

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