

Ilizarov

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[]

Ilizarov

: Ilizarov 17 1

12, 5, Gustilo type 3A가 3, 3B가

2, Melis 1 5, 2 4, 3 8

7 Ilizarov 5

Ilizarov 가 5

7.5 가

Tucker

20.5 Melis

10 가 2, 1

11, 5, 1

Ilizarov

: , Ilizarov

561-712, 634-18

: (063) 250-1137, Fax: (063) 271-6538
e-mail: jrkeem@moak.chonbuk.ac.kr

Iizarov

가

가 ,

가

1995 1 1998 1 Iizarov

17 1

(Table 1). 15 , 2

18 65 45 .

Iizarov 11 , 3 , 2 ,

1 , 3 ,

2 , 2 가 ,

¹⁶⁾ 1 , 1 ,

2 가 . 12 , 5

Table 1. Patient data

Case	Sex/age (yrs)	Type	Closed/Open (type)	Bone graft	Complication	Functional result
1	M/45	III	Closed	+	Pin infection	Excellent
2	M/29	I	Closed	-	Pin infection	Excellent
3	M/60	III	Closed	-	Pin infection	Excellent
4	F/39	III	Closed	-		Excellent
5	M/18	III	Open (IIIa)	-	Pin infection	Good
6	M/56	II	Open (IIIb)	+	Angulation Pin infection	Fair
7	M/48	II	Closed	-		Good
8	F/52	III	Closed	-		Excellent
9	M/25	III	Open (IIIa)	-	Shortening Pin infection	Good
10	M/43	I	Open (IIIa)	+	Pin infection	Excellent
11	M/50	II	Closed	+	Shortening Pin infection	Good
12	M/65	I	Closed	-		Excellent
13	M/47	I	Closed	-		Excellent
14	M/50	III	Closed	-		Excellent
15	M/35	I	Open (IIIb)	+	Pin infection	Good
16	M/55	II	Closed	-		Excellent
17	M/45	II	Closed	-	Pin infection	Excellent

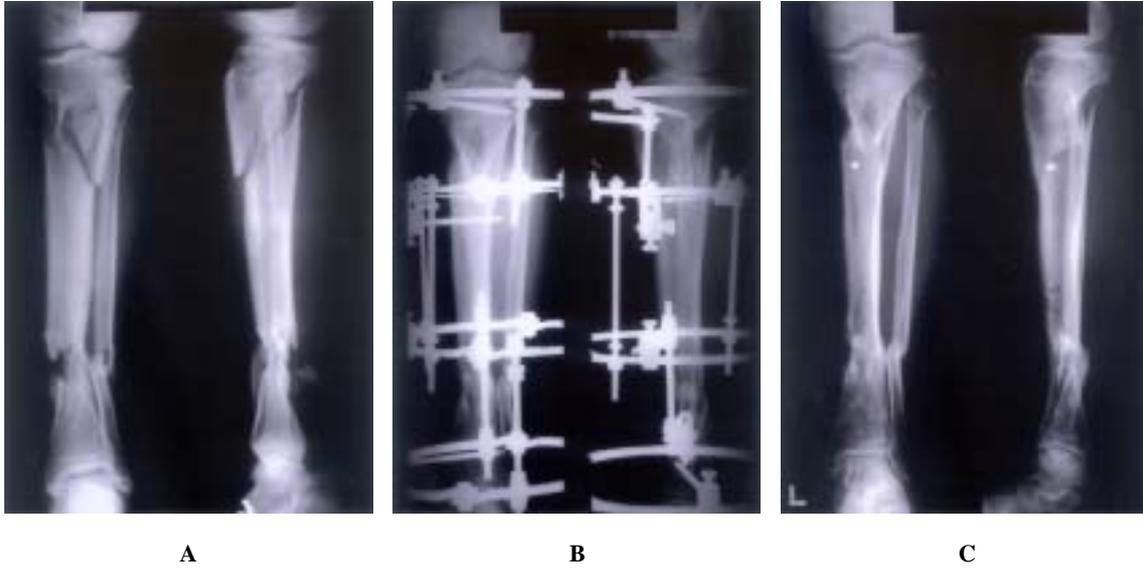


Fig. 1A. Preoperative anterior and lateral roentgenogram shows Meilis type III segmental tibial fracture of the left tibia.
1B. Postoperative 20 weeks roentgenogram shows union of the fracture.
1C. Fracture was consolidated without complication.

Gustilo type 3A가 3 , 5 , 1
 3B가 2 , 2 , .
 2 .
 Melis¹¹⁾ . 1
 1/3 , 1 , 2
 , 2
 1/3 , 가 .
 , 3
 ,
 (Fig. 1), 1 5 , 2 4 , 3 8 . 4, 5
 .
 2
 , 1
 7 Ilizarov , 12 .
 5 Ilizarov , 3 -B ,
 2 Tucker²⁰⁾
 . 가
 5 7.5 가

Ilizarov 9,16,17,20)

가 (internal trans-
port) 5), 3,13,14)

20.5 , 18.2 , 24
. Melis 1
19.4 2 21.3 , 3 20.8 가 Ilizarov
20.3
20.9
2 , 1 , Ilizarov
10 가 2
2 cm
75%
1 8 10 가 가 가
15 95 2 16) 25%
17),
Tucker 11 , 5
1
Sharker 16)
Tucker 20) 100% Ilizarov 22~25
21 ,
bumper 4- (4-point bend- 26.2 19)
ing) 8). 18)
가 9-11,15), , Melis , 4 가
, 1~3 , 4
11,15) 가 Ilizarov 가
가 , 1~3 . Melis 11)

가
half pin
half pin
Ilizarov
가
가
Ilizarov 2
ring
Ilizarov 2 cm
Ilizarov ring
가 2,4,6,17)
5 가
2
3
Ilizarov

REFERENCES

가
Ilizarov 가
가
9)
drilling
10 (58.8%)
(pes anserius) 9 (90%)가
가
8
, 2

- 1) **Aoran AD and Eilert RE:** Results of the Wagner and Ilizarov methods of limb-lengthening. *J Bone Joint Surg*, 78-A: 20-29, 1996.
- 2) **Aronson J, Harrison BH, Stewart CL and Harp JH Jr.:** The Histology of distraction Osteogenesis using different external fixators. *Clin Orthop*, 241: 106-116, 1989.
- 3) **Aronson J, Johnson E and Harp JH:** Local bone transportation for treatment of intercalary defects by the Ilizarov technique. *Clin Orthop*, 243: 71-79, 1989.
- 4) **Cattaneo R, Catagni M and Johnson E:** The treatment of infected nonunions and segmental defects of the tibia by the methods of Ilizarov. *Clin Orthop*, 280: 143-152, 1992.
- 5) **Dagher F and Roukoz S:** Compound tibial fractures with bone loss treated by the Ilizarov technique. *J Bone Joint Surg*, 73-B: 316-321, 1991.

- 6) **Dendrinos GK, Kontos S and Lyristsis E:** Use of the Ilizarov technique for treatment of non-union of the tibia associated with infection. *J Bone Joint Surg*, 77-A: 835-846, 1995.
- 7) **Han SB, Park HW and Lee JH:** Limb reconstruction by the Ilizarov technique combined with free tissue transfer. *J of Korean Orthop Assoc*, 28-6: 2188-2197, 1993.
- 8) **Johner R and Wrushs O:** Classification of tibial shaft fractures and correlation with result after rigid interanal fixation. *Clin Orthop*, 178: 7-25, 1983.
- 9) **Lee GW, Kim KH and Hwang BY:** Complications in the treatment of comminuted fracture and nonunion by Ilizarov procedure. *J Korean Orthop Assoc*, 30-5: 1396-1403, 1995.
- 10) **Macnab I and de Haas WG:** The role of periosteal blood supply in the healing of fractures of the tibia. *Clin Orthop*, 105: 27-33, 1974.
- 11) **Melis GC, Sottgiu F, Lepori M and Guido P:** Intramedullary nailing segmental tibial fractures. *J Bone Joint Surg*, 63-A: 1310-1318, 1981.
- 12) **Paley D:** Problems, obstacles and complications of limb lengthening by the Ilizarov technique. *Clin Orthop*, 250: 81-104, 1990.
- 13) **Paley D, Catagni MA, Argnani F, Villa A, Benedetti GB and Cattaneo R:** Ilizarov treatment of tibial non-union with bone loss. *Clin Orthop*, 241: 146-165, 1989.
- 14) **Park HW, Han SB, Park YJ, Yang KH, Sin DE and Park HJ:** Treatment of gap nonunions of the tibia by the Lizarov method. *J Korean Orthop Assoc*, 31-2: 189-198, 1996.
- 15) **Rhineland FW:** Tibial blood supply in relation to fractures healing. *Clin Orthop*, 105: 34-42, 1992.
- 16) **Shtarker H, David R, Stolero J, Grimberg B and Soudry M:** Treatment of open tibial fractures with primary suture and Ilizarov fixation. *Clin Orthop*, 335: 268-274, 1997.
- 17) **Song HR, Cho SH, Koo KH, et al:** Treatment of tibial fracture with the Ilizarov method. *J Korean Orthop Assoc*, 29-2: 655-664, 1994.
- 18) **Song KJ, Lee YK, Kim JR and Hwang BY:** Interlocking intramedullary nailing of the treatment of segmental tibial shaft fractures. *J of Korean Society of Fractures*, 12-1: 69-75, 1999.
- 19) **Song KS and Jeon SH:** Treatment of tibial fractures using the Ilizarov external fixator. *J Korean Orthop Assoc*, 33-5: 1437-1443, 1998.
- 20) **Tucker HL, Kendra JC and Kinnebrew TE:** Management of unstable open and closed tibial fractures using the Ilizarov method. *Clin Orthop*, 280: 125-135, 1991.

Abstract**Treatment of Segmental Fractures Associated with Periarticular Fracture of the Tibia by Ilizarov External Fixator**

Jung Ryul Kim, M.D., Moon Ki Choi, M.D., Kwang Bok Lee, M.D., Jong Hyuk Park, M.D., Ju Hong Lee, M.D., Jun Mo Lee, M.D., Kyung Jin Song, M.D., Byung Yun Hwang, M.D.

Department of Orthopedic Surgery, Medical School, Institute for Medical Science, Chonbuk National University Hospital, Jeonju, Korea

Purpose: We analyzed the results and complications of the treatment of segmental fractures of the tibia associated with periarticular fracture by using Ilizarov external fixator.

Materials and Methods: We reviewed 17 patients of segmental fractures of the tibia were treated by Ilizarov external fixator and were followed for a minimum one year. There were twelve closed fractures, three type 3A, and two type 3B open fractures. According to Melis classification, there were five type I, four type II, and eight type III. All closed fractures were reduced and fixed with Ilizarov external fixator within seven days. Open fractures were performed immediate wound irrigation and radical debridement and fixed with Ilizarov external fixator. Autogenous iliac bone graft was done in five severe comminuted fractures. Average time in bone graft was 7.5 weeks after operation. We analyzed bony union time according to configuration and site of the fractures, results of the treatment, and complications. The functional outcome was assessed with rating system of Tucker.

Results: In all cases, bony union was obtained, and average union time was 20.5 weeks. According to modified Melis classification, our results showed no difference between each criteria with respect to bony union and there was no difference bony union time between proximal and distal fracture site. There were two leg-length discrepancy less than 2 cm, one partial ankylosis of the knee joint, and ten pin tract infections. The functional results was excellent in 11 cases, good in 5 cases, and fair in one case.

Conclusion: Ilizarov external fixator can be useful method for the treatment of segmental fractures of the tibia associated with juxtaarticular fracture in respect of bony union and functional results.

Key Words: Tibia, Segmental fractures, Ilizarov

Address reprint requests to _____

Jung Ryul Kim

634-18, Keumam-dong, Dukjin-gu, Jeonju, Jeonbuk, 561-712, Korea

Department of Orthopaedic Surgery, Chonbuk National University Hospital

Tel : 063-250-1137, Fax : 063-271-6538

E-mail : jrkeem@moak.chonbuk.ac.kr