

9

4

4.5

15

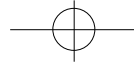
1cm

가

2,3,8,12)

9,14)

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898 • / 13 4

(mechanical axis) 가 , 가 16.5 (10 -31
) , 10 15 (5
 29) , 2 5
 , 가 , 10
 가 1.5cm(0cm 3.5cm) .
 가 10 (55.5%) 가 .
 15 (83.3%),
 13 (72.2%), 2 (11.1%)
 , 1 가 15 Hospital
 , 60 , 30 for Special Surgery(HSS) Knee rating score
 18 가 .

16 , (Multiplane oblique
 oseotomy) 2

13 ,

1992 1 1998 12 3
 26 1 가 Ilizarov 2
 18 65
 (60 72)

8).

가 8 (44.4%) 가 ,
 5 (27.7%),
 3 (19.1%), 가 2(11.1%) 6-

10
 8(44.4%) , 10 (55.5%) 3
 18 16

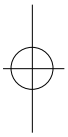
2 가 .

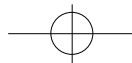
1

36 (30 48)
 4.2 (1 10) 16.5

가 10 3 (0 -10) ,
 15 2

, 5 0





, 1.5cm 0.5cm 1cm ,
 (Table 1). 1
 (varus
 mechanical axis)
 (valgus
 mechanical axis)
 10 6
 가 , 15 가가
 (HSS score) 69 ,
 82 가 , 가
 가 가 (Table 2, 3).
 18 17 4.5 (Sarmiento ¹⁷⁾ 5 22.7%
 3.5 6) .
 1 ,
 1 1 가 .
 , 1,2,19).
 1 6
 , 1 가 , Mayo ⁸⁾
 가 5 , 10 10
 , Johnson ³⁾ 5

Table 1. Clinical data of patients who have undergone corrective osteotomy for tibial malunion

Patient No.	Age /Sex	Deformities (Preoperative)			
		Varus (degree)	Shortening (Cm)	Ant.bowing (degree)	Pos. bowing (degree)
1	55/M	14	-	-	-
2	66/M	19	2	15	5
3	57/M	12	-	6	-
4	69/M	15	-	18	-
5	70/M	15	3	20	-
6	72/M	17	2	-	-
7	62/M	30	4	26	-
8	56/M	20	2	12	-
9	63/M	19	2	5	-
10	60/M	16	2	16	-
11	59/M	15	-	-	-
12	57/M	14	-	-	-
13	62/M	17	1	-	-
14	63/M	11	-	-	-
15	61/M	13	-	-	-
16	65/M	18	1	14	5
17	63/M	16	2	18	-
18	67/M	15	-	-	-
	65/M	16.5	1.5	15	5

**Table 2.** HSS Knee rate scores at final follow up

	No. of knee	
	Preop	Postop
100-85 (Excellent)	1	4
84-70 (Good)	3	8
69-60 (Fair)	7	2
59- (Poor)	3	1
Total	15	15

Table 3. HSS Knee Score changes of individual items

Items	Preop	F/U
1. Pain	14	23
2. Function	12	15
3. ROM	17	17
4. Muscle strength	9	9
5. Flexion deformity	8	9
6. Instability	9	9

**Fig 1A.** Varus malunion in a 63-year-old male patient.**1B.** Postoperative roentgenogram of osteotomy through old fracture site and fixation with static IM nail**1C.** Radiograph at post operative 12month shows that the fracture is well united. Dynamization(removal of the distal screw) was done 2 Weeks later postoperatively

가
Milner¹¹⁾
가
(mechanical axis)
65
10
Mast⁷⁾
1), 2), 3)
3
Mayo⁸⁾
가

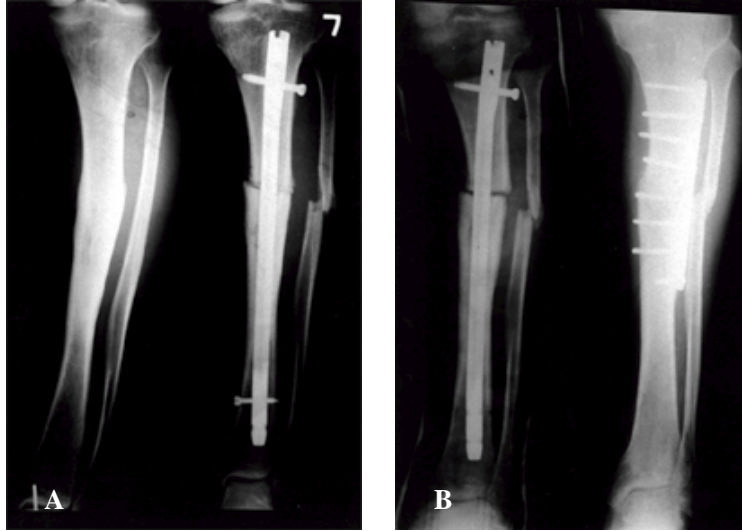
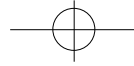


Fig 2A. Varus malunion in a 65-year-old male patient had corrective osteotomy with IM nail.

2B. 9 months later nonunion was developed and reoperation with plate and bone graft was done. Complete union was achieved.

2,15) Ilizarov¹²⁾
Johnson³⁾ Mayo⁸⁾

, Sangeorzan¹⁶⁾

가

가가

. Johnson²⁾

가

. Paley¹²⁾ Ilizarov

Sanders¹⁵⁾

가

13

가

3

, Ilizarov

Johnson³⁾

Mayo⁸⁾

2

Mayo⁸⁾

Johnson²⁾

4

6

, Sanders¹⁵⁾

9

4.5

. Puno

3,8),

14)

8.2



, Kristensen ⁴⁾ 20 15
 , ,
 Tarr ¹⁸⁾
 15

, Merchant ¹⁰⁾

29

가

McKellop⁹⁾

18 15

, 2

가

가

1

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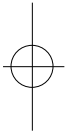
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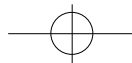
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Abstract

Treatments of the Malunited Tibial Shaft Fracture

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Purpose : The malunited diaphyseal tibia fractures result in tibial shortening, angular deformities, gait disturbance, development of joint pain, etc. The authors analyzed the results of treatment consist of corrective osteotomy for diaphyseal malunion with internal or external fixation.

Materials and methods : The authors reviewed 18 cases of tibial diaphyseal malunion treated in Korea Veterans Hospital between January 1992 and December 1998. Mean follow-up period was 4.2 years. The preoperative deformities were varus, anterior or posterior bowing and shortening. The preoperative symptoms were knee joint pain, ankle joint pain, and gait disturbance. Corrective osteotomy was done on the site of malunion in all cases. Fixation were done with IM nailings(13 cases), plates(3 cases) and Ilizarov external fixator. We analyzed the unions radiologically and the knee pains with HSS score.

Results : All malunions were successfully corrected. Mean duration of union was 4.5 month. In the coronal plane, preoperative varus deformity(mean 16.5 °varus) was corrected to 3 °of valgus. In the sagittal plane, anterior and posterior bowing was corrected to neutral. In 15 cases of the patient with knee joint pain, the mean HSS score was improved from 69 preoperatively to 82 postoperatively.

Conclusion : The correction of tibia diaphyseal malunion had good results by osteotomy at the malunited site and firm internal or external fixation. And it also improved knee joint pain significantly.

Key words : Tibia, Diaphysis, Fracture, Malunion, Osteotomy