



11, 3, 1998 7

The Journal of the Korean Society of Fractures
Vol.11, No.3, July, 1998

Internal bone transport

= Abstract =

Internal Bone Transport for Treatment of Infected Non-union of Long Bone

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Infected nonunion of long bone frequently accompanies with bone loss, because of the outcome of initial trauma or iatrogenic result from sequestra resection. In this study, infected and ununited long bone fracture was treated with internal bone transport technique which was first described by G.A. Ilizarov. There were eleven tibial and two femoral nonunion. The mean number of admission was 2.8 times; mean number of operation was 8 times; mean duration of treatment was 16.5 Mo; 8.5cm of mean defect was lengthened during the mean of 136 days, and average healing index was 1.95 month/cm. All infections were cured and all nonunions were united. Functional result was excellent in 5 cases (of 13 cases), good in 5, fair in 2, and 1 had poor result. Many complication had been observed. All had infection of pin site and pain at least one time, 5 had stiff knee, 9 had stiff ankle, early consolidation(1), delay consolidation(3), tibiofibular synostosis(5), nerve injury(1), refracture after union(1), angular deformity over 5

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*

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degree(7), rotational deformity over 10 degree(2).

Key Words : Tibia, Femur, Nonunion, Infection, Internal Bone Transport

1 . 9 ,
3 , 1
(Table 1).
Ilizarov
가
(corticotomy)
7 14
, 1 0.25mm 4
G.A. Ilizarov 가 6,11,15)
(docking)
3,10,11,14,15,16)
가 가
, 가 Ilizarov
Ilizarov 가
, Ilizarov
1991 1995
, Ilizarov 가
6 가가
13 .
13 , 15-63 (35.4 (dystrophy),
, 11 가 , 2 가 6,
10 , 1 , (problem), (obstacle),
1 , 가 (complication) 가 2,11).

Table 1. Cause of infected nonunion

	tibia	femur
open fracture	8	1
closed fracture	2*	1
others	1**	0

* : congenital pseudoarthrosis (1 case)

** : nontraumatic osteomyelitis

2.8 (2-6),
8 (2-10), Ilizarov 12.6
(7-19), 16.5 (7-28)

. 1



Table 2. Basic radiologic result

	amount of lengthening(cm)	time required for lengthening(day)	time required for maturation(month)	healing index (month/cm)	
1 M/43	6.5	69	12	1.8	Tibia
2 M/37	6.5	188	7	1.1	
3 M/38	7.5	130	9	1.2	
4 M/49	6.5	102	11	1.8	
5 M/25	8.0	80	14	1.8	
6 M/29	4.5	120	14	3.1	
7 M/15	2.0	25	10	5.0	
8 M/48	8.0	90	10	1.3	
9 M/53	7.5	141	9	1.2	
10 M/63	24.0	160	19	0.8	
11 M/32	5.2	120	18	3.5	Femur
12 M/42	8.0	150	14	1.8	
13 M/33	16.5	370	17	1.0	
mean	8.5 (7.8*/12.3**)	118.8 (111.3/160.0)	12.6 (12.1/15.5)	1.95 (2.05/1.40)	

* : mean for tibia

** : mean for femur

Ilizarov

(Table 3)6. 13 5

4

, 5

, 2

, 1

. 1

.

,

5 ,

9 ,

,

8.5cm(2-24cm) 가

136 (25-

(1),

(3),

(5),

160)

,

가

(1),

(1), 50

(7), 100

healing index

1.95month/cm (0.8-5.0)

(Table 2).

(1)

, (2)

(

150

),

(3)

,

, (4)

가

(5)

(

)

,

,

,

,

가

Table 3. Criteria of functional result

noteworthy limp
 stiffness of either the knee or the ankle
 soft tissue sympathetic dystrophy
 pain that reduced activity or disturb sleep
 inactivity

- excellent : active AND none of the other four
 criteria

- good : active, but one or two of the other criteria

- fair : active, but three or four of the other criteria

- poor : inactive regardless of the other criteria



Table 4. Problem, obstacle, and complication

entity	number of case (P-O-C*)	
pain	13(P)	8,16)
pin site infection	12(P) + 1(C)	,
joint stiffness		11)
knee	5(P)	
ankle	8(P) + 1(O)	,
premature consolidation	1(O)	.
delayed consolidation	3(P)	
intraoperative nerve injury	0	.
compartment syndrome	0	
nerve injury(temporary)	1(P)	

* problem - obstacle - complication

4,15)

가

(2)

(consolidation)

16)

(obstacle)

3

, 1

, 1

Ilizarov

가 1 (true complication)

(Table 4).

2,16)

가

가

15,17)

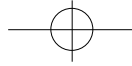
12)

가

가

15)

(vascularized



osseous transfers)

가

19) . 1

. Wood 19) 1

40%

가

가

. Ilizarov

. Goldstrohm 7)

, 39

61%

(dormant formation)

가

10%

49 가

Weiland 18)

87.5%

가

15

Bray⁵⁾

4cm, 17cm

16

. Ilizarov

가

13 Ilizarov

가

, 13 10 (77%)

Table 3

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-5
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