

3

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,

[]

: 3

: 7

42

15

76 가 35, 가 7, IIIa 14, IIIb 20, IIIc

8 가 Tucker

: IIIa 9.2, IIIb 11.0, IIIc 13.8

, IIIc

. 가 IIIc

: , IIIa

, IIIb IIIc

: 3

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*

(33.3%), IIIb 20 (47.6%), IIIc 8 (19.1%) IIIb
가 .
13 (30.9%), 14 (33.3%), 8
(19.1%) 7 (16.7%) .
가
3.
가 ,
42 31 (73.8%)
, , , 2
, , 11).
4 (Table 2).
4. 가
3
12). 3
가
가 Tucker 9)
, 125
, 75%, 1 cm
, 7 , 15
1994 9 2002 8
1 가 42
12 51
23.5 .
(fair), 4 (good), 5 (poor)
가 .
5.
42
1.
가 35 (83.3%), 가 7 (16.7%) , IIIa 6 ,
15 76 , 10 가 2 , 20 1 , 5 , 2
가 6 , 30 가 7 , 40 가 7 , 50 가 7 , 60 가 가 , IIIb
10 , 70 가 3 . 6 , 11 ,
3 가 가 , IIIc
2. 6 , 1 , hybrid
42 가 38 1 가 가 (Ta-
(90.5%) 가 가 2 , ble 3).
2 (Table 1). IIIa 5 (35.7%) , 4 (28.6%)
Gustilo IIIa 14 , 3 (21.4%)

Table 1. Causes of injury

Cause	No. of cases
Incar TA	10 (23.8%)
Autobike TA	14 (33.3%)
Pedestrian injury	14 (33.3%)
Fall down	2 (4.8%)
Crushing injury	2 (4.8%)
Total	42 (100%)

Table 2. Associated injury

Site	No. of cases
Fracture	
Fibular Fx.	18
Upper extremities	8
Lower extremities	13
Pelvis	5
Facial bone	4
Others	5
Abdomen injury	2
Brain injury	4

Table 3. Methods of fixation

Method	IIIa	IIIb	IIIc
IM nail	6 (42.9%)	6 (30.0%)	
External fixator			
Mono	5 (35.7%)	11 (55.0%)	6 (75.0%)
Circular (Ilizarov)	2 (14.3%)	3 (15.0%)	1 (12.5%)
Hybrid			1 (12.5%)
Plate	1 (7.1%)		
Total	14 (100%)	20 (100%)	8 (100%)

1 (7.1%)
IIIb 8 (40%) , 10
(47.6%) , 11 (52.4%)
3 (14.3%)
IIIc 5 (62.5%)
, 6 (75%) , 6 (75%)

Table 4. Soft tissue procedure

	IIIa	IIIb	IIIc	Total
Rotational flap	4 (28.6%)	10 (47.6%)	6 (75.0%)	20
Free flap	1 (7.1%)	3 (14.3%)	2 (25.0%)	6
Skin graft	5 (35.7%)	8 (40.0%)	5 (62.5%)	18

Table 5. Functional result (by Tucker)

Result	IIIa	IIIb	IIIc
Excellent	11 (78.6%)	13 (65.0%)	5 (62.5%)
Good	2 (14.3%)	2 (10.0%)	1 (12.5%)
Fair	1 (7.1%)	2 (10.0%)	
Poor		3 (15.0%)	2 (25.0%)
Total	14 (100%)	20 (100%)	8 (100%)

Table 6. Complications

Complication	IIIa	IIIb	IIIc	Total
Infection				
Pin tract	2 (14.3%)	1 (5.0%)	2 (25.0%)	5
Deep wound	1 (7.1%)	7 (35.0%)	5 (62.5%)	13
Limitation of ROM	1 (7.1%)	6 (30.0%)	2 (25.0%)	9
Peroneal nerve injury	1 (7.1%)	3 (15.0%)	2 (25.0%)	6
Malunion	1 (7.1%)	4 (20.0%)	3 (37.5%)	8
Nonunion	1 (7.1%)			1

, 2 (25%)
, 5 (62.5%)
(Table 4).

IIIa 9.2 , IIIb
11.0 , IIIc 13.8
Tucker 9
IIIa
11 , 2 , 1 , IIIb 13 ,
2 , 2 , 3 , IIIc 5
, 1 , 2 (Table 5).
42 25 59.5%

13 가 . 9 , 8 , 5 , . Piccioni Guanche¹³⁾ 6 , 1 20 IIIa , IIIb IIIc 1 2 가 (Table 6). , 3

type IIIa IIIb 6 dynamization 가 1 type IIIb 1 Velazco¹⁸⁾ 88%가 9). 90.5% Ilizarov 가 1 가 1,2,5) Cierny⁶⁾ Gaudle⁸⁾ type I, II 가 , type IIIa , type IIIb, c . Fischer⁷⁾ 2 13 9 11 2 가 type IIIb IIIc 17 7¹⁵⁾ , IIIa , IIIc Ilizarov Ilizarov type 가 3 가 1 . Ilizarov IIIb IIIc

Schemitsch¹⁴⁾ 25% . IIIc 5 1 1 mm 가 (consolidation)가 2/3가

Ilizarov 4~12 , 94~100% , IIIc 13.8 . Taylor¹⁶⁾, Tucker¹⁷⁾

IIIa 4%, IIIb 52%, IIIc 42% Gustilo¹⁰⁾

38% , Chan⁴⁾ III , Claudle³⁾

IIIa 0%, IIIb 59% 42 13 (30.9%) , IIIa 1 (2.3%), IIIb 7 (16.7%) IIIc 5 (11.9%)가 .

IIIa , , IIIb IIIc , 가

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Abstract**The Results of Operative Treatment in Open Type III Tibia Fracture****Kyung-Jin Song, M.D., Sung-Jin Shin, M.D., Byung-Yun Hwang, M.D., Myung-Sik Park, M.D.**

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Purpose: The purpose of this study was to analyze the functional outcome and propose the guidelines in the surgical treatment of open type III tibial fracture.

Materials and Methods: We have analyzed the treatment results of 44 cases; age was ranged from 15 to 76 years, and there were 35 males and 7 females. The type of fracture according to the classification by Gustilo revealed type IIIa 14 cases, type IIIb 20 cases and type IIIc in 8 cases. We analyzed functional outcome according to the classification of functional result by Tucker.

Results: The average union time of type IIIa was 9.2 months, IIIb 11.0 months, and IIIc was 13.8 months. The rotational flap and free flap were done during treatment and bone lengthening especially in type IIIc. Functional results were poor especially in type IIIc.

Conclusion: Debridement of devitalized tissue, early soft tissue coverage and sufficient stability using intramedullary nails will be necessary in type IIIa fracture. Rigid external fixation, early soft tissue coverage by rotational muscle flap and free flap reduced infection rate with satisfactory functional outcome especially in type IIIb and IIIc fractures.

Key Words: Open type III tibia fracture, Rigid fixation, Bone graft, Free flap

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