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<		>	
:		가	
: 1998 6		2001 6	
40	48	13	15 (30-75 . 48
14 .	1 )		
12	27	17	가 , , ,
Salama 가			
Bohler		. Sanders	
2 (13%),	9 (60%),	4 (27%)	가
: Salama 가	가 2 ,	가 8 ,	3 , 2 ,
Bohler	5. 35. ,	15. 45. ,	
15. 40. .		5 ,	
4 .	가		
:			
:	,	,	,

:

344-2

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\*

2000

가

가 ,

가

Essex-Lopresti 17),

6,13)

가

1.

가 1998 6 2001 6

가

2,8,11,19)

40 48

15 18

가 12

가가 13 15

48 (30 -75 )

3,15,18), 가 12 , 가 1

10 (67%),

4 (27%), 1 (6%)

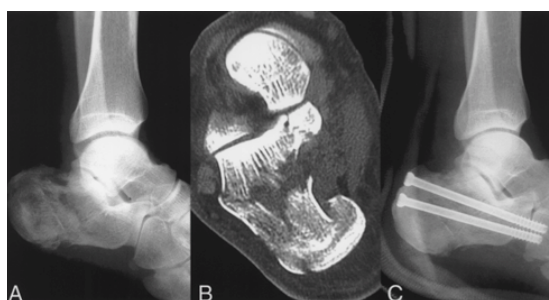
**Table 1.** Demographic Data of Intraarticular Calcaneal Fracture Patients

Case	Trauma-op * interval(days)	F/U period † (months)	OP ‡ position	Essex-Lopresti type	Sanders type	Associate injuries
1	4	14	supine	Joint depression	I	Spine Spine &
2	5	24	prone	Joint depression	III/III	Intracranial HØ §
3	1	15	supine	Joint depression	III	Lower extremity
4	3	12	prone	Joint depression	II	Spine
5	2	18	lateral	Tongue	II	Spine
6	1	15	prone	Tongue	II	Spine
7	1	16	supine	Joint depression	II	Lower extremity
8	1	26	prone	Joint depression	III	Spine
9	3	17	prone	Joint depression	II/II	Spine
10	1	27	prone	Tongue	I	Spine
11	3	15	prone	Tongue	II	Spine
12	5	12	lateral	Joint depression	II	Lower extremity
13	5	13	supine	Joint depression	II	Lower extremity

Trauma-op \* : Trauma-operation F/U period † : Follow up period  
OP ‡ : Operation HØ § Hemorrhage

가 Essex-Lopresti 8)  
11 , 4 ,  
Sanders가 15)  
I 2 (13%), II 9  
(60%), III 4 (27%) II 가  
24 가 5 ,  
가 10  
3 (table 1).

2. 가



**Fig. 1** : Pre- and postoperative radiographs of a 43-year-old man who fell from 3m.

- A:** Preoperative lateral radiograph of a joint depression type fracture.
- B:** Computed tomography(CT) scan demonstrates the primary fracture line with medial wall blowout. This was classified as a Sander 's type IIa.
- C:** Postoperative radiograph shows anatomic reduction of the posterior facet and calcaneal height held with two cannulated screw. One of the screw should pass immediately inferior to the angle of Gissane. Preventing plantigrade rotation of the posterior facet in the saggittal plane by support gained from purchase in the anterior portion of the cuboid.

Essex-Lopresti  
Tornetta 17)  
steinmann  
C-  
Bohler

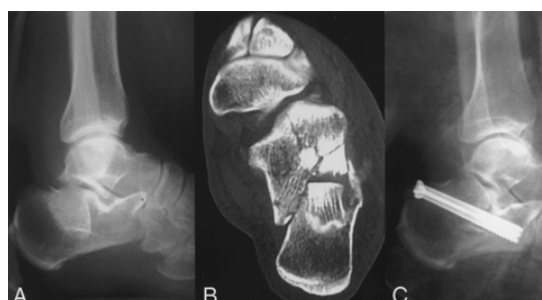
가 가

steinmann

6-8  
8-10

(Fig. 1, 2).

가 가



**Fig. 2** : Pre- and postoperative radiographs of a 40-year-old man who injury by stone.

- A:** Preoperative lateral radiograph of a joint depression type fracture.
- B:** Computed tomography(CT) scan demonstrates the primary fracture line with medial wall blowout. This was classified as a Sander 's type IIb.
- C:** Postoperative radiograph shows anatomic reduction of the posterior facet and calcaneal height held with two cannulated screw. One of the screw should pass immediately inferior to the angle of Gissane within anterior calcaneous.

**Table 2.** Criteria used in assessment of esults(Salama)

Excellent	Patient satisfied
	Normal mobility of joint
	Asymptomatic broadening of the heel
	No pain
Good	Patient satisfied but occasional pain
	Walking ability unaffected
	Slight limitation of inversion-eversion
	Mild flat foot
Fair	Patient not entirely satisfied(reserved)
	Pain after exertion
	Walking ability reduced
	Limitation of tarsal movements
	Special shoes
Poor	Patient not satisfied
	Pain even on slight effort
	Walking ability markedly reduced
	Severe limitation of joint movement
	Change of occupation

, 가 , ,  
14)(table 2)  
Bohler 가

Bohler 가

Rowe 13) 가

1. Bohler 18, (5 ° 35 °)

25, (15 ° 45 °), 26, 가

(15 ° 40 °) , 가 5

4 , (table 3).

2. Salama 가 가 2 , 가8

, 3 , 2

3 가2 , 2

가 1 Sanders 1

**Table 3.** Radiological and clinical results

Case	Calcaneal deformity	Subtalar arthritis	Salama criteria
1	N	N	Excellent
2	Y/Y	Y/Y	Poor/Fair
3	Y	Y	Poor
4	N	N	Good
5	N	N	Good
6	N	N	Good
7	N	Y	Fair
8	Y	Y	Fair
9	N/N	N/N	Good/Good
10	N	N	Good
11	N	N	Good
12	N	N	Excellent
13	N	N	Good

Y : yes N : no

가  
가1

Connolly<sup>6)</sup> 2

Rowe 13) 가

Essex-Lopresti 8) 2

Bohler 가

가 가

Sanders 1



steinmann

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Sanders

가

가

steinmann

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## Abstract

## Operative Treatment of Intraarticular Calcaneal Fractures Combined with Multiple Injuries using Closed Reduction and Cannulated Screw Fixation

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**Purpose :** To evaluate the radiological and clinical results of closed reduction and cannulated screw percutaneous fixation of intraarticular calcaneal fractures combined with multiple injuries.

**Materials and Methods :** We reviewed 15 cases of 13 patients intraarticular calcaneal fractures combined with multiple injuries which were treated with closed reduction and cannulated screw percutaneous fixation between June 1998 to June 2001 and minimum follow up period of 12 months(12-27 months). The results were based on the assessment criteria of Salama and the analysis of Bohler's angle, states of subtalar joint and deformities of calcaneus. Based on the Sanders classification, there were 2 cases(13%) of type I, 9 cases(60%) of type II and 4 cases(27%) of type III.

**Results :** The preoperative Bohler's angles were between 5° to 35°; postoperative Bohler's angles were between 15° to 45° and the last follow up Bohler's angles were between 15° to 40°. The postoperative complication of subtalar arthritis were developed in 5 cases and deformities of calcaneus were developed in 4 cases. Based on the assessment criteria of Salama, the functional results were excellent in 2 cases, good in 8 cases, fair in 3 cases, and poor in 2 cases.

**Conclusion :** The closed reduction and cannulated screw percutaneous fixation of intraarticular calcaneal fractures combined with multiple injuries was thought to be a useful method of treatment at the state of not delayed operating time and not position changing.

**Key Words :** Calcaneus, Intraarticular fractures, Closed reduction, Cannulated screw

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