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= Abstract =

Comparison of the conservative and operative treatment of the intraarticular calcaneal fractures

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The calcaneal fracture, which is considered to be the most common tarsal bone fracture, has rather difficulty in accurate diagnosis, classification and proper treatment. Furthermore, its prognosis is not good, either. The authors analysed 68 intraarticular calcaneal fractures (Sanders type II & III only) out of 147 cases, which were treated operatively or conservatively from June 1990 to May 1997, and found out that the results of conservative and operative treatment were approximately the same. The length of follow-up ranged from one year to four and half years (mean, 2.7years). The results were as follows: Of the 24 conservatively treated group, seven had excellent; eleven good; four fair; and two poor result. Of the 44 operatively treated group, eleven had excellent; twenty seven good; five fair; and one poor result. The sum of excellent and good results in conservative and operative treatment group were 75.0% and 86.4% each other, and these were not meaningful statistically ($p=0.400$). Therefore, the authors recommend a conservative treatment as an effective alternative method for the intraarticular calcaneal fracture.

Key Words : Calcaneus, Intraarticular fracture, Conservative treatment

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2.

가

57 가

4 , 5 , 2 .

27 가

pilon

21).

2 , 1 , 2 ,

2 . 5 .

1 , , ,

3,

Broden 's view²⁵⁾ 10°, 20°, 30°, 40°

60

가

70

가

가80

4).

4.

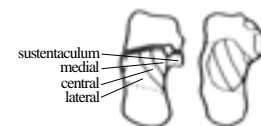
가

(p = 0.400).

Essex-Lopresti¹⁶⁾Sanders³⁸⁾ 2 3 44

2 3 24 1

가 가 68



1990 6 1997 5

147

Sanders³⁸⁾ 2 3

TYPE IIA



TYPE IIB



TYPE IIC



III AB



III AC



III BC



TYPE IV

64 68 44 (2 28 , 3 16

), 24 (2 19 , 3 5) .

1.

43 , 21 67.2%가

16 71 36 .

20 30 64.7% .

Fig 1. CT scan classification of intraarticular calcaneal fractures. (From Sanders R, Fortin P, DiPasquale T, Walling A: Clin Orthop 290:87, 1993)

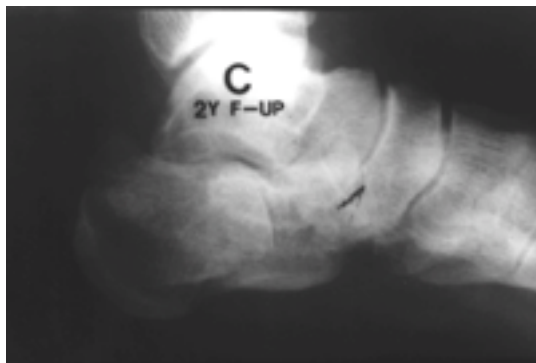
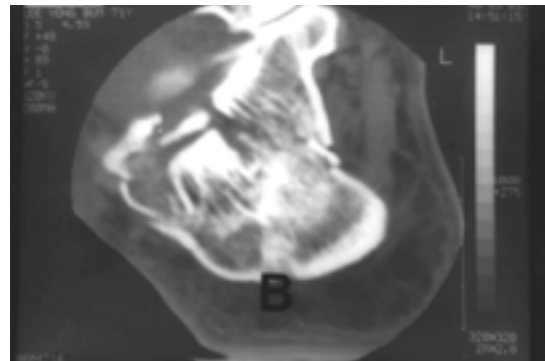
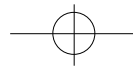


Fig 2. A 52-year-old male patient with left calcaneal fracture.

- A.** Initial roentgenogram, which shows intraarticular tongue type calcaneal fracture. (Böhler angle, 0°)
- B.** Coronal CT scan shows displaced 3 large fragments of intraarticular fracture of the calcaneus (Sanders type III).
- C.** The roentgenogram of 24 months after trauma shows good healing state with reversed Böhler angle. The result was good.

43 , 104 (63 ,
41) .

가 Salama³⁷⁾

Sanders³⁸⁾ Sanders³⁸⁾ 가 .
Sanders³⁸⁾ 가
1 , 1
3 2 , 2
3 , 3 4
A, B, C (Fig 1).
1 20 , 2 47 , 3 21 , 4 6 .
Sanders³⁸⁾ 2
2 2 가
22 2 가

Creighton-
Nebraska Health Foundation Assessment Sheet for
Fractures of the Calcaneus⁷⁾ (Table 1)

1 4.5
2.7 . 2 19
, 3 5 , 2
28 , 3 16 .
7 (29.2%),
11 (45.8%), 4 (16.7%), 2 (8.3%)
, 11 (25.0%), 27
(61.3%), 5 (11.4%), 1 (2.3%)
(Table 2). Sanders 2 3

**Table 1.** Assessment sheet for fracture of the calcaneus*

Point		Point	
Pain(30 points)			
Activity			
Rest			
No pain	15	No pain	15
Mild pain	10	Mild pain	10
Moderate pain	5	Moderate pain	5
Severe pain	0	Severe pain	0
Activity (20 points)		Range of Motion(20 points)	
Unlimited walking	20	25 to 30 = 80 to 100%	20
Walks 500-1000m	15	20 to 25 = 60 to 80%	15
Walks 100-500m	10	15 to 20 = 40 to 60%	10
Walks less than 100m	5	10 to 15 = 20 to 40%	5
Cannot walk	0	0 to 10 = 0 to 20%	0
Return to Work(20 points)		Change in Shoe Size(5 points)	
Full time, Same job	20	No change	5
Full time, with restrictions	15	Change	0
Full time, change job	10	Swelling(5 points)	
Part time, with restrictions	5	None	5
Cannot work	0	Mild	3
		Moderate	2
		Severe	0
Total Score		100	

* Modification from Creighton-Nebraska health foundation assessment for fractures of the calcaneus. A score of 90 to 100 points judged to be an excellent result; 80 to 89 points, a good result; 65 to 79 points, a fair result; and 64 points or fewer, a poor result.

Table 2. The results of operative and conservative treatment in Sanders type II and III

Result	Type II	Type III	%
	Op. / Non-op.	Op. / Non-op.	Op. / Non-op.
Excellent	6 / 7	1 / 4	29.2 / 25.0
Good	9 / 20	2 / 7	45.8 / 61.3
Fair	3 / 1	1 / 4	16.7 / 11.4
Poor	1 / 0	1 / 1	8.3 / 2.4
Total	19 / 28	5 / 16	100 %

Table 3. The change of Böhler angle in operative and conservative treatment group

Degrees		Op. group		Non-op. group	
		Preop.	Postop	Initial	Follow-up
-20	-11°	3	0	0	0
-10	-1°	14	0	0	0
0	10°	20	10	10	13
11	20°	7	15	9	8
21	30°	0	19	5	3
Total		44	44	24	24

78.9%, 60% 2 3 Böhler -10° 10°
 96.4%, 68.7% 2 3 10° 30°
 가 18° , Böhler -20° 5°

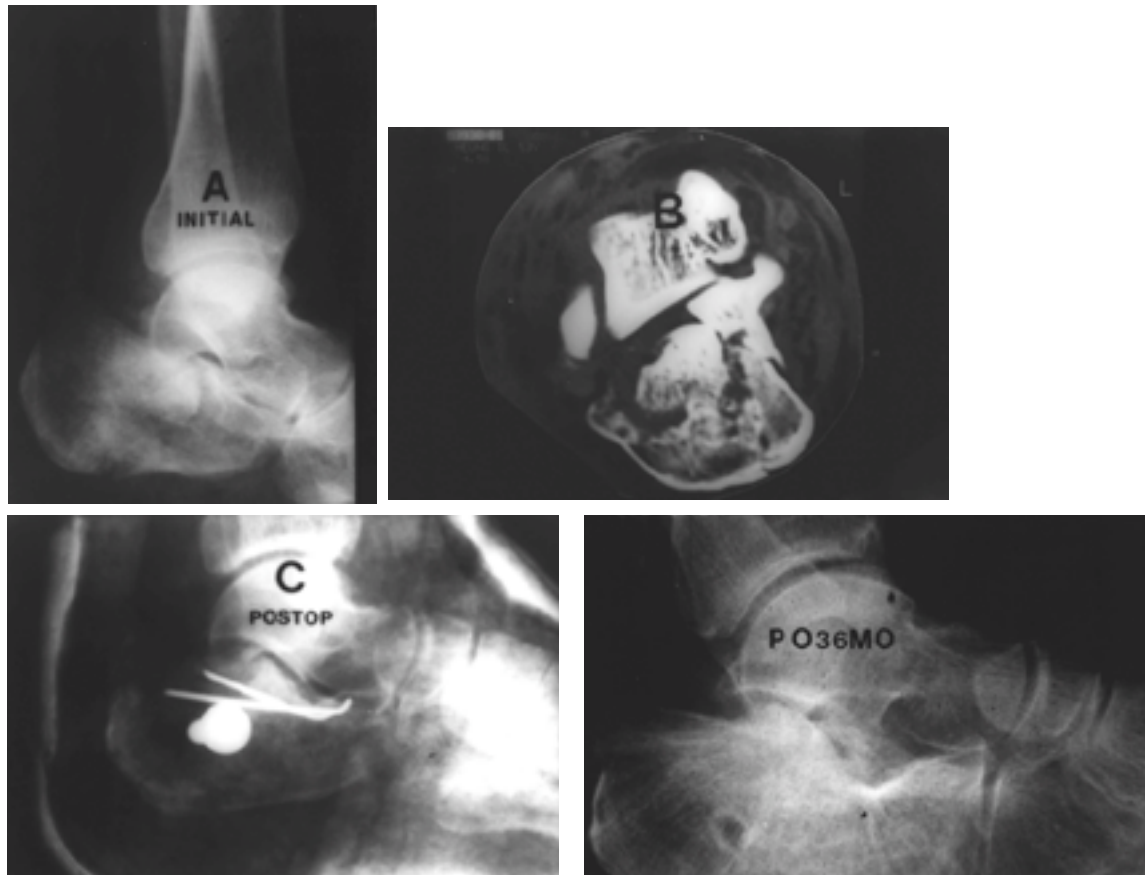


Fig 3. A 53-year-old male patient with left calcaneal fracture.

- A.** Initial roentgenogram, which shows intraarticular tongue type calcaneal fracture.
B. Coronal CT scan shows displaced 3 large fragments of intraarticular fracture of the calcaneus (Sanders type III).
C. The roentgenogram after operation shows well restored articular facet.
D. The roentgenogram of 36 months after operation shows and good healing state.

Table 4. Clinical results according to Böhler angle

Angle/Result		Excellent	Good	Fair	Poor	Total(%)
Reverse		3	10	3	2	18 (26.5)
0	10	3	9	3	1	16 (23.5)
11	20	6	7	2	0	15 (22.1)
21	30	6	12	1	0	19 (27.9)
Total(%)		18(26.5)	38(55.9)	9(13.2)	3(4.4)	68 (100)

-20.

2.

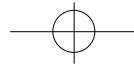
(Table 3). Böhler

가 (Table 4).

75.0%

86.4%

(p = 0.400).



340 •

/ 12 2

11,31,35,41)

30)

가

1 2% , 60 75% 가 17,32,35,38)

60%, 12,19,22,36)

가

가

가

가

3

14,28,29,38)

45. 50. ,

60.

4,11,15,20,23,24,38,41).

가

Widen⁴²⁾

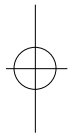
가

가

2

Connolly¹³⁾

가



(ecchymosis)

Mondor 's sign

Sanders 2

16).

Broden 's view²⁵⁾

가

가

2

3

Böhler

10), Gissane

가

, 가

Broden 's 4 6

view²⁵⁾

12

12

3 4

가 1,6,9,14,18,19,23,26,34,38,39,40).

6

(Table 3).

Sanders³⁸⁾

가

1

, 2

147

101

Essex-Lopresti

16) Sanders³⁸⁾

, 3

, 4

가

,

1

33),

10,16),

가

2

3

27),

4

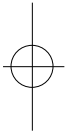


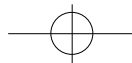


1
McLaughlin²⁷⁾, Rowe³⁶⁾ Creighton-Nebraska
Poza³³⁾ Sanders 2 3
가 가
76% . 가
2 3 4 (p =
가 0.400)
6 . Sanders 2 3
12 가 가
가 가 가
가 Salama³⁷⁾ ,

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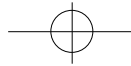
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가 , Böhler 가 2) , , :
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7) , , , , :
 , 31:606-614,
1990 6 1997 5 7 1996.
147 8) , , , , :
Sanders 2 3 , 29:1819-1826, 1994.
68





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