
< >
 :
 가 25 ~ 30% 가 가
 :
 73 2 가 30 (%)
 AOFAS(American Orthopaedic Foot and Ankle Society)
 Chi-square 가 5%
 : AOFAS 가 1 가 7 , 23
 :
 가가

:
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* 2002
 * 2002

(%)

(gap) (step off)

가 25~30%

11,12,13,14,21)

가

가 8,9)

가

가

1991 2000

73

2 가 30

1.

() 23

() 7

2. 가

AOFAS(American Orthopaedic Foot and Ankle Society) 1994

Ankle-Hindfoot Scale¹⁵⁾ 40 , 50 ,

10 가 (Table 1).

3.

4.

square 5%

1. (AOFAS scale)

30 40

1

가 (Table 2).

Table 2. Clinical Results
(Mean AOFAS scales in each group)

	No-pain group	Pain group
Pain	40	30
Function	50	49.6
Alignment	10	10

2.

18.8%, 26.1%

1.1mm, 1.7mm

0.5mm,

1.4mm

Chi-Square

가 (Table 3).

Table 1. AOFAS Ankle-Hindfoot Scale (100 points Total)

Pain(40 points)	
None	40
Mild, occasional	30
Moderate, daily	20
Severe, almost always present	0
Function(50 points)	
Activity limitations, support requirement	
No limitations, no support	10
No limitation of daily activities, limitation of recreational activities, no support	7
Limited daily and recreational activities, cane	4
Severe limitation of daily and recreational activities, walker, crutches, wheelchair, brace	0
Maximum walking distance, blocks	
Greater than 6	5
4-6	4
1-3	2
Less than 1	0
Walking surfaces	
No difficulty on any surface	5
Some difficulty on uneven terrain, stairs, inclines, ladders	3
Severe difficulty on uneven terrain, stairs, inclines, ladders	0
Gait abnormality	
None, slight	8
Obvious	4
Marked	0
Sagittal motion(flexion plus extension)	
Normal or mild restriction(30 °or more)	8
Moderate restriction(15 °-29 °)	4
Severe restriction(less than 15 °)	0
Hindfoot motion(inversion plus eversion)	
Normal or mild restriction(75%-100% normal)	6
Moderate restriction(25%-74% normal)	3
Marked restriction(less than 25% normal)	0
Ankle-hindfoot stability(anteroposterior, varus-valgus)	
Stable	8
Definitely unstable	0
Alignment(10 points)	
Good, plantigrade foot, ankle-hindfoot well aligned	10
Fair, plantigrade foot, some degree of ankle-hindfoot malalignment observed, no symptoms	5
Poor, nonplantigrade foot, severe malalignment, symptoms	0

Chi-square
(Table 4).

가 1,25)

Table 3. Difference in Fixation Methods.

Fixation	Mean	
	no-pain group	pain group
Cast	2	1
Internal Fixation		
not fix PM	15	4
fix PM	6	2
Total	23	7

PM : posterior malleolus
 Pearson Chi-Square value(2.485) was less than critical value(5.99, =0.05). So, there was no significant difference in fixation methods.

Table 4. Significance of radiologic and clinical factors.

Factors	Mean		
	no-pain group	pain group*	
PM † size(%)	8.8	26.1	0.851
Gap(mm)	1.1	1.7	0.042
Step off(mm)	0.5	1.4	0.011
Age(yr)	48.7	47.0	0.521
ROM(wks)	7.6	7.0	0.125
PWL ‡ (wks)	7.6	7.4	0.249
FWL §(wks)	12.6	12.6	0.761

p : p-value by Logistic regression test, significant p-value<0.05

† PM: posterior malleolus
 ‡ PWL: partial weight loading
 §FWL: full weight loading

25~30%
 11,12,13,14,21)
 (static incongruity) (dynamic incongruity),
 20)
 1/3

19,24)
 Sachs
 가
 25%
 가 가
 26)
 가
 가 가
 가
 3,28,29)
 가
 20,27)
 가
 8,9,10,23)
 25%
 2,4,5,6,12,14,21,30)
 가



Fig. 1. Radiographs showing initial and immediate post-operative findings. Minimal gap(1mm) and no step off were found and size of the posterior malleolar fragment was 28% of the joint surface. Clinical result was excellent based on AOFAS scale 100.

가
25%
7
25%
가 1
6
가
(Figure 1.)
가 (Table 3.)
가
(Table 4.)

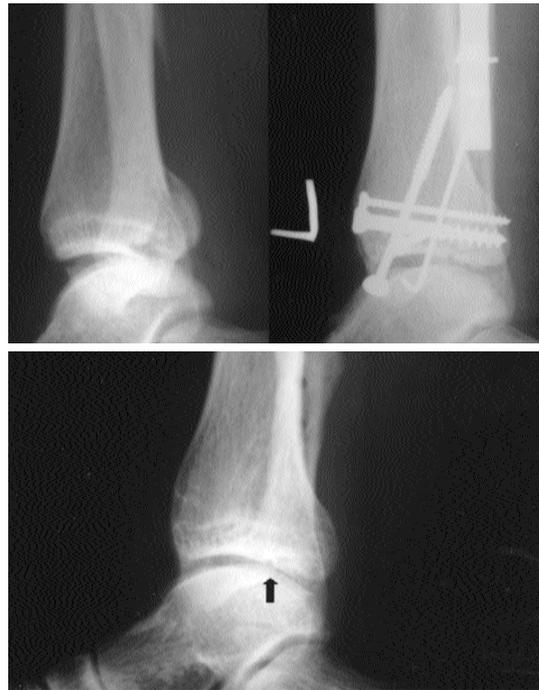


Fig. 2A-B. (A) Initial and immediate post-operative lateral plain radiographs. Two millimeter fracture gap was found without step off and size of the posterior malleolar fragment was 22% of the joint surface. Clinical result was not so good because of joint pain. (B) Follow up radiograph shows remnant gap on the articular surface(arrow).

2~3
16,18) 30
3 가 21
가
가
Ebraheim
CT 가
가

(Figure 2.)
가

가
가
25%
가
가
17)
가

가

가 가

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The role of posterior malleolar fragments in ankle pain after trimalleolar fractures

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Purpose : There are some criticisms of indication for internal fixation of the posterior malleolar fragments in trimalleolar fractures. We tried to find out clinical and radiologic factors which affect on a clinical outcome of trimalleolar fractures.

Materials and Methods : Thirty three patients who were treated for trimalleolar fractures and given anatomical reduction of lateral and medial malleolus were included. We divided patients into two groups, a group without the pain and the other group with the pain. Preoperative and postoperative lateral plain radiographic films were used to estimate fragment size, post-reduction gap and step off. By reviewing the medical records, other factors such as the time of ankle motion, weight loading and whether posterior malleolus was fixed, or not were studied. A clinical outcome was evaluated by AOFAS(American Orthopaedic Foot and Ankle Society) scaling system. We performed statistical analysis using Logistic regression analysis and Chi-square test on each factors.

Results : There was no definite difference between two groups on the functional outcome. There was one case showing limited ankle motion. Seven patients were involved in the group with the pain and 23 in the group without the pain. The remnant fracture gap and step off of joint surface statistically showed the meaningful correlation with the pain but a fragment size and a surgical fixation, time of motion and weight loading did not show any significances.

Conclusion : We doubt the significance of the size of posterior malleolar fragment. We concluded that anatomical reduction of posterior malleolus is the most significant factor of a clinical outcome regardless of the size or internal fixation, especially the pain after trimalleolar injuries.

Key Words : Ankle, Trimalleolar fracture, Posterior malleolus, Ankle pain

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