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= Abstract =

Treatment of Fractures of the Distal Radius with External Fixator

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Purpose : Recently, intraarticular fractures or unstable fractures with severe comminution of the distal radius are increasing in younger ages, which are known to be difficult to treat. We designed this study to evaluate the clinical results and the prognosis of the external fixators for the treatment of the fractures of the distal radius.

Material and Method : We reviewed 16 cases of the distal radius fractures, which were treated surgically with the external fixators since January 1995 to December 1997. We applied the external fixator with closed reduction and Kirschner-wire fixation in 8 cases, and in the rest of the cases we did minimal open reduction before the application of the external fixator, because it was not enough to reduce the articular fragments in those cases with closed reduction. For the analysis of the clinical results, we used the Demerit point rating system, and for the analysis of the radiologic parameter, we measured radial height, radial inclination, and volar tilting in comparison with the uninjured side from the anteroposterior and the lateral X-ray films which were taken at preoperative, postoperative, and last follow-up period.

Results : In clinical results by Demerit rating point system, 2 cases were excellent, 10 cases

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were good, 4 cases were fair, and none of the cases was poor. In radiologic results, the average of the radial height was 8.43mm, the average of the radial inclination was 17.68o, and the average of the volar tilting was 3.87o.

Conclusion : It is suggested that external fixator is one of the useful modalities in the treatment of the unstable fractures of the distal radius, and we can also improve the results of the intraarticular fractures by using the minimal open reduction technique.

Key Words : distal radius, unstable fracture, external fixator, minimal open reduction

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1.

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가

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가

16 (16)

12

26

18

가 14

가 2

가

30 52

가

가

44

14 (87.5%)가 nondominant hand

2 (12.5%)가 dominant hand

12 (75%),

가 2 (12.5%),

2 (12.5%)

가

가

Frykman

8)

Type 8 (50%), Type 8 (50%)

2 (12.5%)

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2.

8

,

8

1

가가

16

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3

6

12

8

.



**Table 1.** Demerit point rating system used to evaluate end results

Items	Points
Residual deformity(range 0-3 points)	
No gross deformity	0
Prominent ulnar styloid	1
Residual dorsal tilt	2
Radial deviation of hand	2 or 3
Subjective Evaluation(range 0-6 points)	
Excellent : no pain, disability, or limitation of motion	0
Good : occasional pain, slight limitation of motion, and no disability	2
Fair : occasional pain, some limitation of motion, feeling of weakness in wrist, no particular disability if careful and activities slightly restricted	4
Poor : pain, limitation of motion, disability and activities more or less markedly restricted	6
Objective Evaluation*(range 0-5 points)	
Loss of dorsiflexion	5
Loss of ulnar deviation	3
Loss of supination	2
Loss of pronation	2
Loss of palmar flexion	1
Loss of radial deviation	1
Loss of circumduction	1
Tenderness st the R-U joint	1
Grip strength : 60% or less than on opposite side	1
Complications(range 0-5 points)	
Arthritic change : minimum	1
minimum with pain	3
moderate	2
moderate with pain	4
severe	3
severe with pain	5
Nerve complication : median	1-3
Poor finger function due to cast	1-2
Final result(range of points)	
Excellent	0-2
Good	3-8
Fair	9-20
poor	>21

*The objective evaluation is based on the following ranges of motion as being the minimum for normal function : dorsiflexion - 45 degrees, palmar flexion - 30 degrees, radial deviation - 15 degrees, ulnar deviation - 15 degrees, pronation - 50 degrees, and supination - 50 degrees.

**Table 2.** Clinical Result (by Demerit point rating system)

Method \ Result	Excellent	Good	Fair	Poor
C/R, pinning & E/F	2	5	1	0
minimal O/R, pinnin & E/F	2	5	1	0
Total	2	10	4	0

Table 3. Summary of end results and radiologic parameters

No. of case	End result	V.T.*	R.H. †	R.I. ‡
1	Excellent	10	11	21
2	Excellent	6	10	20
3	Good	1	10	19
4	Good	0	9	20
5	Good	5	8	16
6	Good	3	9	17
7	Good	3	10	23
8	Fair	5	4	16
9	Good	3	11	22
10	Good	1	10	21
11	Good	5	9	15
12	Good	4	9	18
13	Good	2	10	15
14	Fair	4	8	10
15	Fair	2	3	14
16	Fair	4	4	16
Mean		3.87	8.43	17.68

No. 1-8 ; C/R, pinning & external fixator

No. 9-16 ; minimal O/R, pinning & external fixator

* volar tilting(degrees) : negative means dorsal tilting

† radial height(milimeters)

‡ radial inclination(degrees)

2.

Sarmiento Demerit point rating system 가

1. 가 Sarmiento¹⁸⁾ (62.5%), 가 2 (12.5%), 가 10

Demerit point rating system , 가, 가, 가 가 75%

, 가, 가, 가 가 (Table 2)

, , , 11mm), 17.68 (10-26), 8.43mm(3mm-

(Table 1). 3.87 (0-10) .

, , 4

, 가 3mm-8mm, 가 10-

. 16, 가 2-5.

(Table 3)

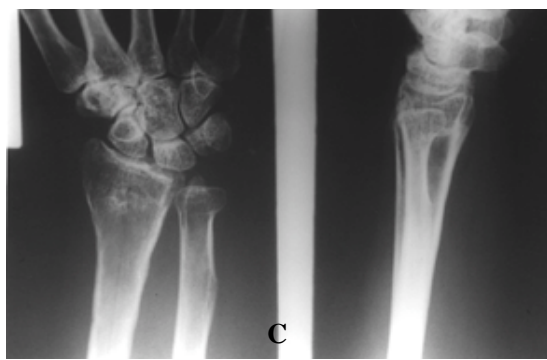
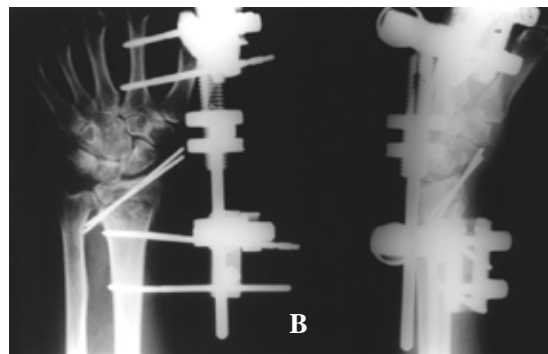
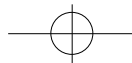


Fig 1-A. Preoperative radiographs of 49-year-old woman. This radiographs shows a Frykman type fracture.

1-B. Postoperative radiographs taken after the treatment of closed reduction, pinning & external fixation, which shows good restoration of the joint line, radial height and volar tilting.

1-C. Follow-up radiographs at 2 years after the operation shows complete union of the fracture. The final clinical result was excellent.

가 , (2)

, (3)

16

가

가

가 2,3,6,15,16,19,20)

가

가

가

(ligamentotaxis)^{1,17,21)}

3

1,5,7,10,11,17,21) . Horesh¹⁰⁾

Zagorski²²⁾

, ,

, Cooney⁴⁰⁾ (1)

가 25.

10mm

,

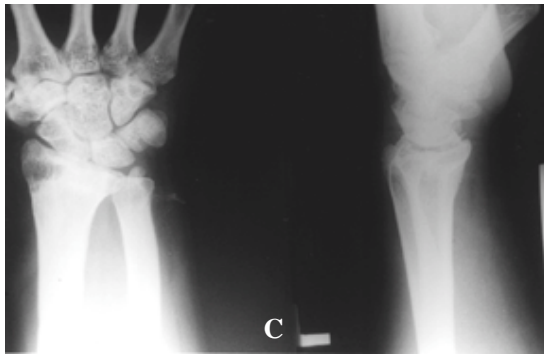
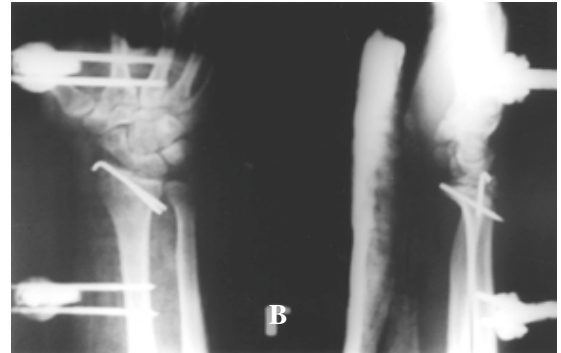
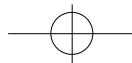


Fig 2-A. Preoperative radiographs of 30-year-old man. This radiographs shows a Frykman type fracture.

2-B. Postoperative radiographs taken after the treatment of minimal open reduction, pinning & external fixation, which shows acceptable range of radial height, volar tilting and articular congruity.

2-C. Follow-up radiographs at 1 year after the operation shows complete union of the fracture. The final clinical result was good.

(articular incongruity)
가 . 16 2o 가 2mm 21). 5mm , 가
8 , Demerit point rating system 가 (fair)
8 4 3.75o (2o -5o)
8 5 Demerit point rating system 12 3.58o (0o -10o)
(good) 3 (fair) 3.67mm(3mm-4mm) 3
9.67mm(8mm-11mm) 12
(fair) 가 8mm 가 가
가
(radial height), (radial 6 12
inclination) (volar tilting) 8 .



가

1995 1 1997 12

1

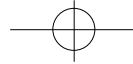
가가 16

1.

2. (ligamentotaxis)

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