

=Abstract=

## **Operative Treatment of the Distal Intraarticular Radial Fracture with Volar Approach**

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Distal radius is a part which contain distal radioulnar joint and radiocarpal joint. Distal radial fracture is occurred by direct trauma of slip down, but recent, high energy injury of traffic accident or falling down injury is increased. Closed reduction or external fixation give good result in large part but, open reduction is needed in unstable fracture or intraarticular comminuted fracture. We reviewed 16 cases of distal radial fractures operated with volar approach. The most common fracture was Frykman VIII-B type and in universal classification IV-C type. T-plate, kirschner's wire and Herbert screw were used in internal fixation and bone graft was applied in 3 cases. In case of volar Barton's fracture, displaced Smith's fracture, comminuted intraarticular fracture, more than 2mm articular incongruency and in case closed reduction cannot give anatomical reduction due to comminution and displacement, we tried open reduction and internal fixation with volar approach. Even if main fracture fragment was displaced posteriorly, in case of severe comminution, we applied internal fixation in volar non-comminuted fragment. Excellent was 6, good 7, fair 2 and poor was 1 case. Radial inclination was improved from 8.3° to 17.5° and volar tilting was improved from -5.4° to 8.6°. There were 2 cases of complication of pain on distal radioulnar joint. In distal radial fractures which need operative treatment, open reduction and internal fixation with volar approach gave satisfactory result.

**Key Words** : Distal radius, Fracture, Open reduction, Volar approach

가  
가

1995 2 1997 2  
730

가

4, 6)

가  
가 가

1.

가  
16 가 11 , 가 5 ,  
가 4 (25%) 가 4  
(25%) 8 (50%) 가  
10 ,

가 가 6 2 1cm 가

5)

Barton , Smith  
가 2mm 2

가  
가 16 Frykman VIII 8

**Table 1.** Fracture type according to Universal & Frykman's classification

Universal type		Frykman type	IV	VII	VIII	Total
IV-A			1			1
IV-B				4	1	5
IV-C				3	7	10
Total	1		7	8	16	

**Table 2.** Result

Case	Gender	Age	Type of implant	Pre-op.		Post-op.		ROM (F/U)	
				Radial inclination	Volar tilting	radial	volar	Flex	Ext.
1	M	26	T-plate	27	-23	23	8	60	45
2	M	35	T-plate & K-wire, Herbert screw	13	-1	20	11	50	40
3	M	65	T-plate & K-wire	12	-8	20	5	20	30
4	F	72	T-plate & K-wire, bone graft	10	0	19	5	60	40
5	M	60	T-plate & K-wire	7	-18	20	10	40	60
6	M	24	T-plate & K-wire	4	20	22	15	60	40
7	M	46	T-plate & K-wire	12	-26	18	12	80	30
8	M	42	T-plate & K-wire, bone graft	10	12	18	12	50	50
9	M	49	T-plate & K-wire	6	-14	14	10	50	60
10	M	29	T-plate & K-wire	2	0	20	12	45	60
11	F	44	T-plate & K-wire	4	2	25	6	70	60
12	M	57	T-plate & K-wire	16	1	20	6	40	40
13	M	55	T-plate & K-wire, Herbert screw	5	-25	20	7	60	50
14	M	68	T-plate & K-wire, External fixator	6	-2	15	5	40	40
15	F	57	T-plate & K-wire, bone graft	4	-25	24	12	30	20
16	F	60	T-plate & K-wire	5	5	20	9	40	50

(50%) 가 , VII 7 , IV .  
 1 . Universal IV-C  
 10 (63%) 가 , IV-B 5 , 가 13 , 2  
 IV-A 1 (Table 1). 1  
 14 , 2 .  
 3 , 가  
 2 가  
 2 . volar Barton's fracture 1 .  
 comprehensive classification B T  
 3.1 -volar marginal intra-articular fracture- 가 K Herbert  
 가 2 . 2  
 가  
 3. (Table 2).  
 2, 3

**Fig. 1-A.** Frykman type IV, Universal type IV-B fracture, radial inclination was 13° and volar tilting was -1°

**B.** Using T-plate, one Kirsc-hner's wire and one Herbert screw, internal fixation was done after open reduction with volar approach. It was improved to radial inclination 20° and volar tilting 11°

**C.** On follow-up radiologic examination of post-operative 3 months, It showed that well maintained radial inclination , volar tilting and fracture site was united well.

6 2 1 2

16

system	가	Demerit point
point system	,	Demerit
가		7)
Demerit point	system	
	6 , 7 , 2 ,	
1	16	13

, K

8.3 (1° - 27°)

K

17.5 (10° - 30°)

, 6 (4 - 8)  
, 4 K

-5.4 (-26° - 12°)

8.6 (6° - 19°)

20°

80 °      50 °      30 °-70 °      (Fig. 2-A).      T-  
47 °      ,      ,      (Fig. 2-B).  
16      1      3mm      , 1      1      가 23 ° 8 °      (Fig. 2-C).  
Sauve-Kapandji      3  
20 °, 30 °;      53      Frykman type VIII ,  
15 °, 20 ° ,      Universal      type IV-C      (Fig3-A),  
T-      3      K-      (Fig3-B).  
5      5      K-      .  
, 1      6      2 가      12 °, -8 °  
가      가      , 1      20 °, 5 °      1  
3mm      (Fig. 3-C).  
가      1      .  
가      1      .  
17%,  
75%      8) .  
1      ,  
35      ,      Frykman  
type IV , Universal type IV-B      (Fig.      13)  
1-A), T-      , 1      K-      1  
Herbert      6  
(Fig. 1-B). 4      K-  
.      가  
13 °, -1 °      20 °, 11 °      ,  
, 1 6      .  
40 °, 60 °  
60 °, 70 °      (Fig. 1-C).  
10-12) . Weber  
2      ,      13) , Cooney  
26      Frykman  
type VIII , Universal type IV-B      27 °  
-23 °      ,      20 °      10mm

**Fig. 2-A.** Frykman type VIII ,  
 Universal type IV-B  
 fracture, radial inclination  
 was 27 ° and volar tilting  
 was -23 °

**B.** Using T-plate and Kirsch-  
 ner's wire, internal fixa-  
 tion was done after open  
 reduction with volar app-  
 roach. It was improved to  
 radial inclination 23 ° and  
 volar tilting 8 °

**C.** By post-operative 12months,  
 internal fixation was re-  
 moved and radiologic  
 follow-up was taken. On  
 computed tomogram, des-  
 pite of 1mm articular defect,  
 joint was congruent.

,  
 Rush pin  
 , Ellis

가  
 16) Paul ,

17) ,

,  
 가 . 2mm  
 , 5mm  
 , 20 ° ,

가  
 21) , 가 ,

14, 15) .

**Fig. 3-A.** Frykman type VIII , Uni-  
 versal type IV-C fracture,  
 radial inclination was 12°  
 and volar tilting was -8° .  
 It showed also 7mm radial  
 shortening.

**B.** Using T-plate and Kirsch-  
 ner's wire, internal fixation  
 was done after open reduc-  
 tion with volar approach. It  
 was improved to radial in-  
 clination 20° and volar tilt-  
 ing 5° ,but 3mm radial shor-  
 tening and 2mm positive  
 ulnar variance was remained.

**C.** On post-operative 5months  
 follow-up, 3mm positive  
 ulnar variance was rema-  
 ined and patient complained  
 pain of distal radioulnar  
 joint.

가  
 가<sup>18)</sup>.

가 ,

, 가  
 가

16

가

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 , 가

가  
 Smith                      Barton ,

5, 19) ,  
 가 Kapandji ,  
 20° 30°  
 가 1 .  
 ,  
 가  
 1995 2 1997 2  
 ,  
 730  
 1 가 16  
 ,  
 8.6° 8.3° 17.5° 가 -5.4°  
 Sarmiento demerit  
 point rating system . Jupiter , 가  
 , 가  
 ,  
 21)  
 ,  
 가 2 1) , , :  
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