

Treatment of Bony Mallet Finger with Extension Block Technique

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Purpose: To evaluate results of extension block technique for bony mallet finger.

Materials and Methods: Between March 2002 and March 2005, twenty one patients who received extension block surgery for bony mallet finger were included in this study. Time from injury to operation, extent of joint involvement, subluxation of distal interphalangeal (DIP) joint, time from surgery to K-wire removal, range of motion, complications and patient subjective satisfaction at final follow up were surveyed.

Results: The objective results were evaluated with Crawford's method which assess extension, flexion and pain. Out of 21 patients, 7 were excellent, 11 good, 2 fair and 1 poor. Regarding to subjective satisfaction, 17 patients showed excellent or good, 2 fair and 2 poor results. K-wire was removed at an average of 40 days after surgery. Average DIP motion was 66 degrees, and average loss of extension was 7 degrees. Bone union was achieved in all cases. The fair and poor results were related to improper position of K-wire.

Conclusion: Extension block technique for the treat-

ment of bony mallet finger is a less invasive and useful treatment modality in patients who have greater than one-third involvement of the joint surface, failure of reduction, and distal joint subluxation.

Key Words: Bony mallet finger, Extension block technique

(Extension Block Technique) 21

가

2002 3 2005 3
67 K

21

6

8

가 685

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1. (Fig. 1A,B). 3
 21 가 14 , 가 7 가 0.035 inch K
 . 12 58 39.8 . 22 gauge
 (curette)
 2. . K 가
 , 10 , 5 0 10
 , 가 4 , .
 가 2 .
 14 , 4 ~ 8 가 5 , 8 26 4 가 ,
 . 2 .
 3. 0.045 0.065 inch K
 . K 5~6
 Niechajev (Table 1) 10 2 .
 Type D, E 가 2
 Type D가 15 , Type E가 6 .
 1/4 가 .
 6 가 . 5.
 4. Crawford (Table 2)
 30% 가 , 3 mm 가 4 가 12.
 0.045 inch K () 가 slid-
 ing scale 0 10 가
 9~10 , 7~8 ,
 5~6 , 4 ,
 45 .

Table 1. Classification according to Niechajev

Type	Criteria	No of patients
A	Tendon rupture	0
B	Small avulsion chip fracture,	0
C	Intraarticular avulsion fracture without or with Only minor dislocation of fragment	0
D	Fracture with dislocation of fragment	15
E	Fracture with dislocation of fragment and subluxation of distal phalanx	6

Table 2. Crawford's criteria

Excellent	full extension, full flexion, no pain	7
Good	0° to 10° of extension deficit with full flexion and no pain	11
Fair	10° to 25° of extension deficit, any flexion loss and no pain	2
Poor	more than 25° of extension deficit	1

3. (Table 3)

가 (Mann-Whitney U test)

40 K-66 (47 ~ 83), 73 (56 ~ 83)

7 (0 ~ 25), 8 , 73

1. , 4 12 , 5 , 72 , 12 4 , 73

Crawford (extension lag) 7 , 67 6 , 75

21 가 가 (Excellent)가 7 , 10 (Good)가 11 , (Fair) 2 , (Poor) 가

1 (p=0.062), (p=0.008).

2. 가 4. 5 , 12 , 17 (81%) 2 21 가 2 (9.5%), 2 (9.5%)

Table 3. Extension block technique data

Case	/	-	*	(%)	Joint Subluxation	pin removal (days)	ROM (°)	Ext-Fle (°)
1	F/49	33	35	-	66	60	10~70	
2	M/24	17	40	+	56	56	9~65	
3	M/24	15	50	+	51	61	8~69	
4	M/21	8	60	+	34	47	9~56	
5	F/16	53	50	+	70	75	0~75	
6	M/37	20	45	-	46	66	14~80	
7	F/44	20	30	-	54	68	12~80	
8	M/58	27	40	-	63	80	0~80	
9	M/23	13	35	-	55	75	0~75	
10	M/53	34	50	+	59	59	6~65	
11	F/15	22	35	-	47	70	0~70	
12	M/24	9	50	-	36	45	25~70	
13	M/34	4	60	+	70	62	10~72	
14	M/55	38	40	-	43	66	4~70	
15	M/29	13	55	-	43	66	9~75	
16	F/42	4	45	-	47	67	8~75	
17	M/20	6	50	-	48	83	0~83	
18	F/33	8	50	-	55	76	0~76	
19	M/19	96	40	-	66	73	7~80	
20	M/12	35	40	-	35	75	0~75	
21	F/17	84	60	-	52	62	8~70	

* ; ROM, range of motion; Ext, extension; Fle, flexion

(Fig. 2A-C).

1. 1
 24 (Case 3 in Table 3)
 15 3 50% Niechajev E
 K 45
 6 K 8 69
 Crawford

2. 2
 37 (Case 6 in Table 3)
 (Niechajev D) 4 20
 K
 K (bending) 가
 K 6 2
 6
 14 80 Crawford
 (Fair)
 (Fig. 3A-B).

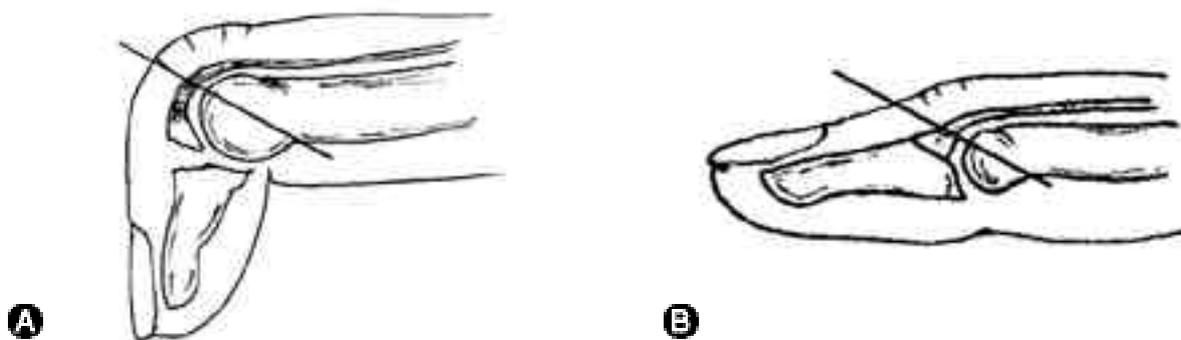


Fig. 1. The position of blocking K-wire. (A) Under fluoroscopy, the distal interphalangeal (DIP) joint is maximally flexed and 0.045 inch K-wire is inserted through the extensor tendon at a 45 degrees into the distal portion of the middle phalanx. (B) The DIP joint is then extended and translated, the fractured fragment is compressed with the aid of blocking K-wire.



Fig. 2. A 24 year old male patient had injury on left middle finger 15 days ago. (A) Preoperative radiograph showed a joint involvement more than 50 percent with displacement and the mild volar subluxation of distal interphalangeal joint. (B) K-wire fixation with extension block technique was performed. (C) Postoperative 6 months, the fractured bone was united well and the patient had a range of motion from 8 to 69 degrees.

가 .
가 .
pull-out 2,4,9, 11, (30%)
K- 13, 5,6,9 가
가 ,
Damron Enber 가 Nakamura 19 6 ,
30% 58 ,
Niechajev 3 mm 가 80%, 38.7%
가 1/3 가
4,10 가 Kanie's scale²⁰ 가 66%
12,14,15-18 Crawford 85%
90% 가 K 5~6
(40)
K
Ishiguro K
7,8 가 2
K 가
가 K 8,21,22
Ishiguro가
(Fig. 4A) K
30%) 가 (K
K
K

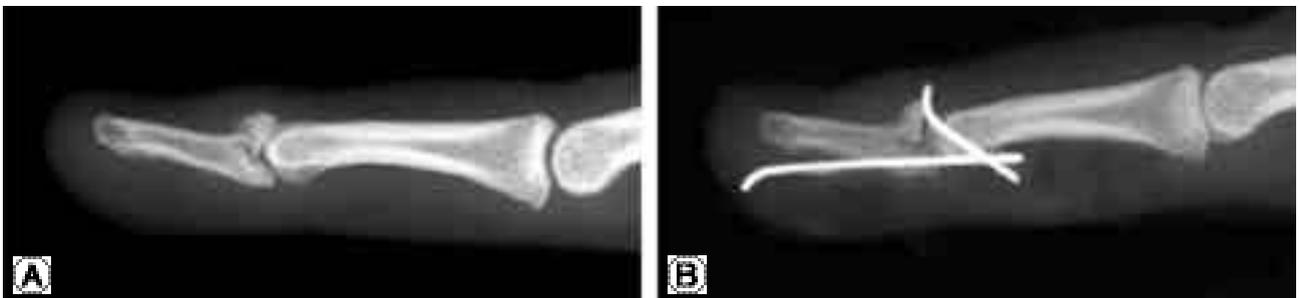


Fig. 3. A 37 year old male patient had bony mallet finger injury on right ring finger for 3 weeks. (A) The initial x-ray showed a displaced dorsal fragment and articular involvement about 50% without subluxation. (B) Despite of blocking K-wire, the fractured fragment was displaced dorsally. Improper bending of the tip of K-wire make further displacement. The patient had developed extension lag 14 degrees.

. Pull-out

- 가
- , K-
- 가
- 가
- 가
- 가
- K
- 8
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