



15, 2, 2002 4

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:

: 12 42 (1, 20), Rush pin  
(2, 11), (3, 11) 가  
modified neer Paavolainen  
Generalized Liner Model  
Fisher's exact test

: 3 가 (p<0.05). 3  
10.33 3 가 9 3  
1 3  
: 가 (p<0.05)

: , , .

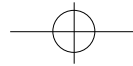
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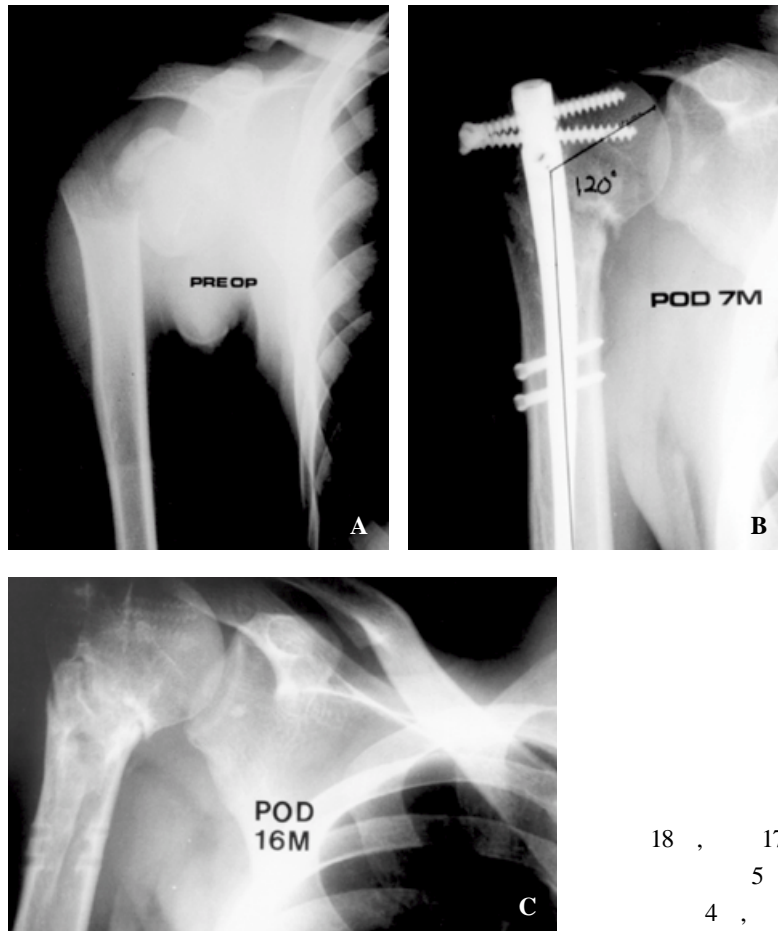
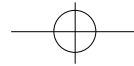
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**Fig. 2A-C.**

Preoperative radiograph(A) of a three-part fracture of the proximal humerus in a 21-year-old male patient and the radiograph after closed reduction and internal fixation with proximal intramedullary interlocking nail(B). Intramedullary interlocking nail was removed at 1 year and 4month after surgery(C).

modified Neer 가  
Paavolainen

18 , 17 , 7 . 1  
5 , 10 , 5 , 2  
4 , 5 , 2 , 3  
9 , 2  
(3 ) 가 (p<0.05)(Table 1).

. 2

가

pendulum exercise

14 , 14 , 4 ,  
4 , 3 , 3 .

1 41 10.33  
, 1 11.22 , 2 10.47  
, 3 9.3 3 가

가 . 3

exercise

1

pendulum

1

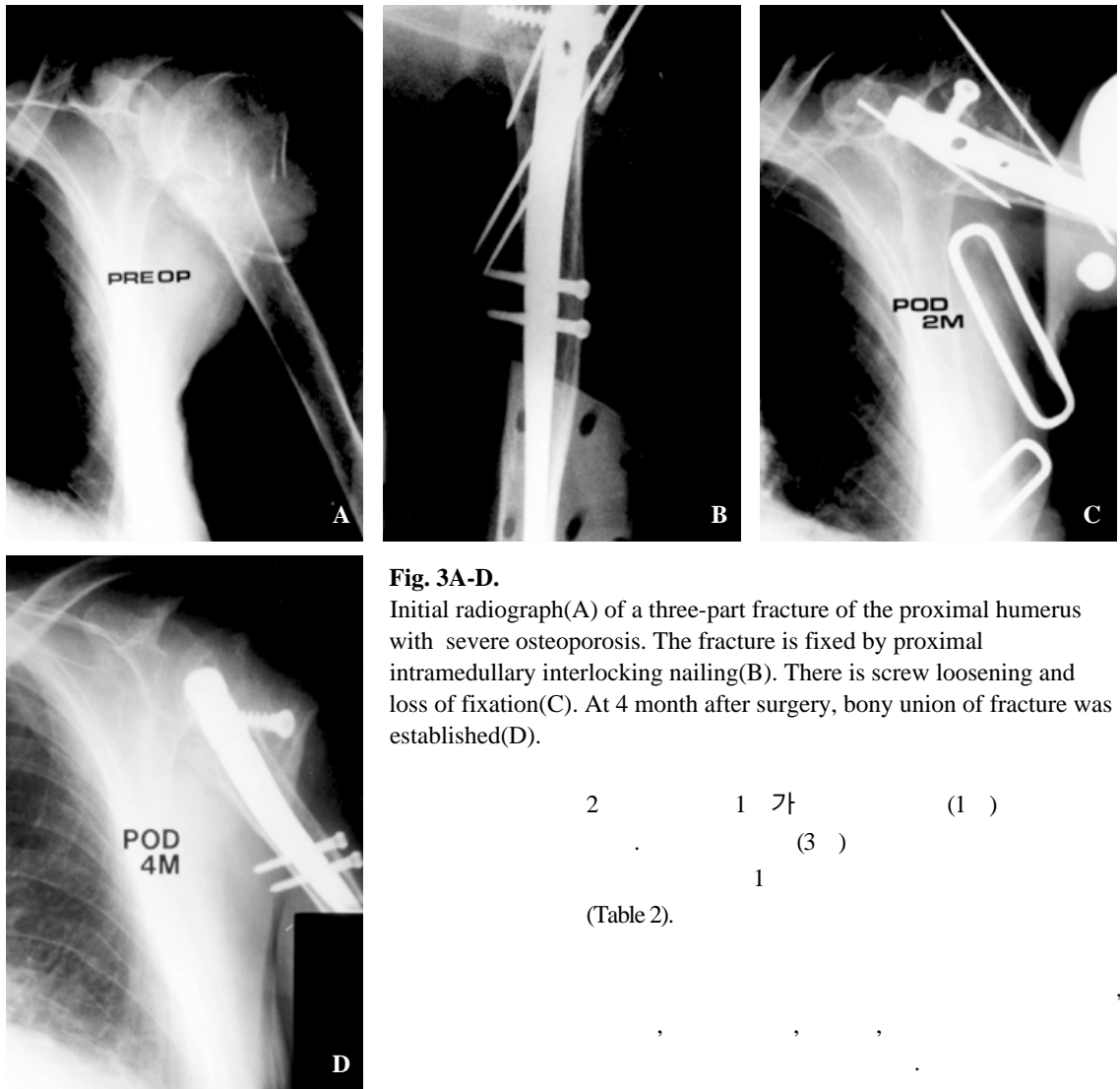
3-4

가 (p>0.05)(Table 1).

Modified Neer

16

, 16 , 3 , 7 .  
1 5 , 10 , 5 , 2  
5 , 3 , 1 , 2  
, 3 6 , 3 , 2  
, 1 74.48 ± 19.85, 2 77.14



**Fig. 3A-D.**

Initial radiograph(A) of a three-part fracture of the proximal humerus with severe osteoporosis. The fracture is fixed by proximal intramedullary interlocking nailing(B). There is screw loosening and loss of fixation(C). At 4 month after surgery, bony union of fracture was established(D).

2 1 가 (1 )  
 . (3 )  
 1  
 (Table 2).

$\pm 24.35, 3$   $79.75 \pm 13.10$  3 가  
 (  $P > 0.05$  )

Table 1).

13 , 14 , 1 , 4  
 , 3 , 2 , 2 , 4-5%<sup>4)</sup>  
 3 .  
 8 9  
 5 가 2 , 1 , 가  
 1 . support)<sup>6)</sup>  
 (1 ) 3 ,  
 (2 ) 2 ,

(Mechanical

**Table 1.** Fracture type, functional score, union time and radiologic result according to treatment methods.

	Group1	Group2	Group3	p-value
Fracture type				
two part	19	7	6	
three part	1	4	5	
Functional score	74.48 ± 19.85	77.14 ± 24.35	79.75 ± 13.10	p>0.05
union time(wks)	11.22	10.47	9.3	p>0.05
Radiologic result				
good	5	4	9	
fair	10	5	2	p<0.05
poor	5	2	0	

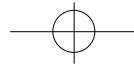
Group 1: conservative method, 2: closed reduction and Rush/percutaneous pin fixation, 3: proximal intramedullary interlocking nailing. Functional score was a sum of the scores obtained from the self-assessed questions form to the maximum possible score of the answered questions. Radiologic result was rated by exact fracture alignment and correct inclination of the humeral neck.

**Table 2.** Complications in eight patients.

Case	Sex/Age	Tx. group	Fx type	Fixation loss	Malunion	Nonunion	Stiffness
1	F/70	1	Two part				Yes
2	F/71	1	Two part		Yes		Yes
3	M/61	1	Two part			Yes	
4	F/63	1	Two part			Yes	
5	F/82	1	Three part		Yes		
6	F/73	2	Three part			Yes	
7	F/67	2	Three part			Yes	
8	F/82	3	Three part	Yes			

Velpeau

7), 14), 5), 3,5,16), 11,13), Clifford<sup>®</sup>, 가, 10), 가, 가, 38%, 가, 2), (1 ), 가, 1, 2, (pendulum exercise) 3-4, 가



304 • / 15 2

가 . 가  
가 . 가  
가 . 가  
(2 ) (1 ) 3 , (2  
) 2 , 2  
가 1 가 (1 )  
(3 ) 1  
3 6  
가 .  
(3 ) 가  
( 11 9 가 ,  $p < 0.05$ )  
가  
1  
(79.75 ± 13.10) (p>0.05).  
1

(accuracy)

(Fig 3).

가 가

(cyclic load) K-wire Rush-pin (stiffness)

(angular displacement)

가

(multipart fracture)

가

15)

가

K-wire

K-wire

가 4

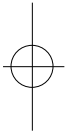
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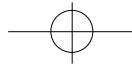
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## Abstract

## The Result of Treatment in Fracture of the Proximal Humerus

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**Purpose** : To evaluate the anatomical and functional outcome after treatment for proximal humerus fracture according to surgical and conservative treatment and assess the final results according to treatment methods.

**Materials and Methods** : Forty-two cases with follow-up over 12 months were divided into three groups: conservative treatment (Group 1, 20 cases), closed reduction with Rush or percutaneous pin fixation (Group 2, 11 cases), proximal intramedullary interlocking nailing (Group 3, 11 cases). The functional outcome was obtained by modified neer method using self-assessed score paper and the anatomical outcome was obtained by paavolainen method using radiologic film score.

Statistics in comparing with the result of each group was analyzed by variance analysis using Generalized Liner Model and Fisher's exact test.

**Result** : Anatomical reduction was best obtained in group 3 ( $p < 0.05$ ) and mean duration of bone union was 10.33 weeks. Functional score was also best obtained in group 3 ( $p < 0.05$ ). Complication was noted in 9 cases. There was only 1 case in group 3. In studing of overall outcome, the group 3 has good result than other groups.

**Conclusion** : Proximal intramedullary interlocking nailing in displaced proximal humerus fracture can be demonstrated as better method for anatomical reduction ( $p < 0.05$ ) than other methods because it can make insertion of locking screw ease with multiple direction for anatomical reduction and can provides a sufficient fixation for early rehabilitation and union, while minimizing complication.

**Key word** : Proximal humerus, Fracture, Proximal intramedullary interlocking nailing.

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