

12, 1, 1999 1

The Journal of the Korean Society of Fractures
Vol.12, No.1, January, 1999

. . . *

*

= Abstract =

Comparison of the Clinical Results Between the Plate Fixation and Intramedullary Nailing for the Diaphyseal Both Forearm Bone Fractures

Hyun-Dai Shin, M.D., Kwang-Jin Rhee, M.D.,
Jun-Young Yang, M.D., Sung-Ho Yun, M.D.*, Mun-Jong Lee, M.D.

*Department of Orthopaedic Surgery, School of Medicine,
Chungnam National University, Kyun Yang University*,
Taejon, Korea*

The fractures of the forearm bone are common and the forearm has the specific movement of supination and pronation. So, the goal of the treatment of forearm fractures is the recovery of rotatory function of the forearm as well as the function of the elbow and wrist. Surgical treatment usually is not necessary in children under 10 years of age because of remodelling potential and spontaneous correction ability. But, anatomical reduction and rigid fixation is essential in fractures of adult forearm above 15 years of age because of rotational deformity and

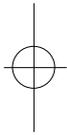
:

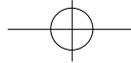
640 (301-040)

Tel : (042) 220 - 7349, 7342, 7343 Fax : (042) 252 - 7098

*

24





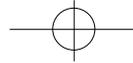
angulation after forearm fractures may result in serious functional problems of the forearm. The purpose of the our retrospective study is to compare the clinical result between the plate fixation and intramedullary nailing of the diaphyseal both forearm bone fractures in adult. We reviewed 64 patients above 15 ages who had diaphyseal both forearm bone fractures, and were treated with fixation using compression plate or Rush pin. Forty patients were treated with both plates, 7 patients with both Rush pins, and 17 patients with plate and rush pin. Galeazzi or Monteggia fractures were excluded in this study. On final follow up, we performed the radiological analysis and compared the operation interval, immobilization period after operation, bone union time, functional result and complications in these groups. Functional results was more higher in both plate fixation, and complications were high in both intramedullary nailing. In conclusion, both plate fixation is the best treatment method in the diaphyseal both forearm bone fractures in adult. Thus in both forearm bone fractures, both plate fixation is recommended, but if it is not available, at least one bone with plate fixation is necessary

Key Words : Both Forearm bone, Fractures, Plate fixation, Intramedullary nailing.



1985 3
 180
 Rush pin
 72 1
 가 가 64
 Galeazzi Monteggia
 1 5 (26)
 7 (11%), 41 (64%),
 16 (25%)
 40 (63%), Rush pin
 7 (11%), 가
 가
 17 (26%)
 15 84 , 37 ,
 가 72 (73%), 가 27 (27%) 25 34
 (27%)
 가 가 (53%)
 가 가 (36%) 가
 가
 가





2. 가 가 4.8 , , 7.2 , bicipital tuberosity 가 가 1. (36%), (23%), 가 22%, 56% 2 (5%) , 4 (57%) , 12.5 , segmental 3 (7%), 15.2 (Table. 1). 3 (39%) 3. 가 6.6 , 12.7 (Table. 1).

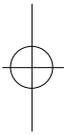
Table 1. Summary of results

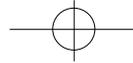
	PP	P&R or RR
Associated injury	22%	56%
Open fracture	5%	57%
Segmental fracture	7%	39%
OP delay time	6.6 days	12.7 days
Immobilization period	4.8 wks	7.2 wks
Time of radiologic bone union	12.5wks	15.2wks
Complications	15%	57%
Bone union rate	98.2%	92%
Angular deformity	10%	23%(P&R), 43%(RR)
Functional result (Excellent or Satisfactory)	87%	56%(P&R), 76%(RR)

OP : Operation

¥ PP : both plate fixation, P&R : one plate and the other Rush pin,

RR : both Rush pin fixation





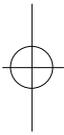
Anderson²⁾ 1, 1, 2, 3 (43%), 4 (23%), 6, 6, 3, 2, 가, 가, 6, 10, 25%, 가, 3, 가, 1, 20, 50%, 가, 30, 50%, 가 87%, 56%, 가 (65%), 76% (Table. 2). 10-70

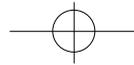
4. 5. 4 (10%) 1,

Table 2. Functional results (Anderson)

		PP	P&R	RR
Excellent	complete bone union <100 limitation of Flx & Ext <25% limitation of Sup & Pro	62%	54%	32%
Satisfactory	complete bone union <200 limitation of Flx & Ext <50% limitation of Sup & Pro	25%	22%	24%
Unsatisfactory	complete bone union >300 limitation of Flx & Ext >50% limitation of Sup & Pro	11%	24%	31%
Failure	no bone union with or without limitation of ROM	2%	8%	13%

¥ Flx : flexion, Ext : extension, Sup : supination, Pro : pronation
 ROM : Range of Motion
 PP : both plate fixation, P&R : one plate and the other Rush pin,
 RR : both Rush pin fixation





1 , 1 , , radio-ulnar synostosis가 1 , 18 (Fig 2-A). , (Fig 2-B), 13 (Fig 2-C), 80 .

3 , 1 2 (57%) (Table. 1).

1. 53 (Fig 1-A). , (Fig 3-A). 2 (Fig 3-B), 14 (Fig 3-C), 40 가 , 20 .

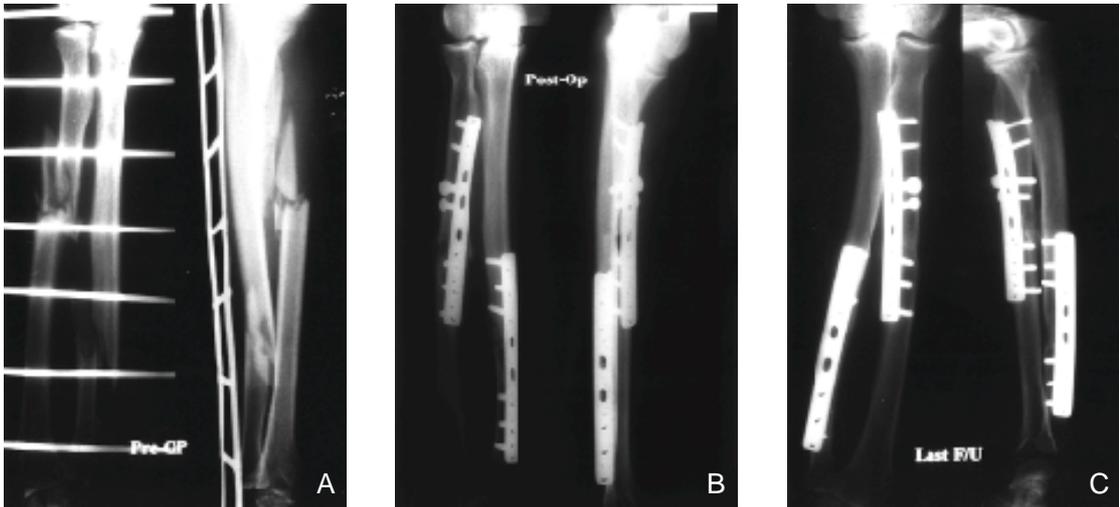


Fig 1-A. Both forearm initial AP and lateral radiograph of fifty-three years old male patient after traffic accident.

B. Postoperative AP and lateral radiograph. Both radius and ulnar treated with DCP.

C. Last follow up AP and lateral radiograph shows complete bone union without malunion. Full range of motion of supination and pronation was achieved.



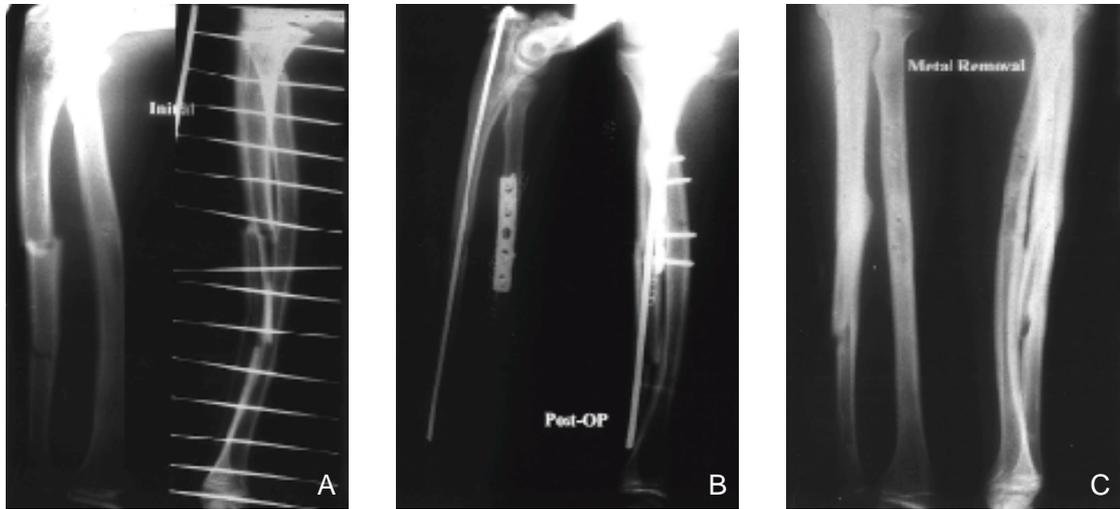
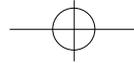


Fig 2-A. Both forearm initial AP and lateral radiograph of eighteen year old male patient after sports injury.
B. Postoperative AP and lateral radiograph. Radius was treated with DCP, and ulna with Intramedullary nailing.
C. Last follow up AP and lateral radiograph shows complete bone union without malunion. Pronation and supination of the forearm was each 80 degrees.

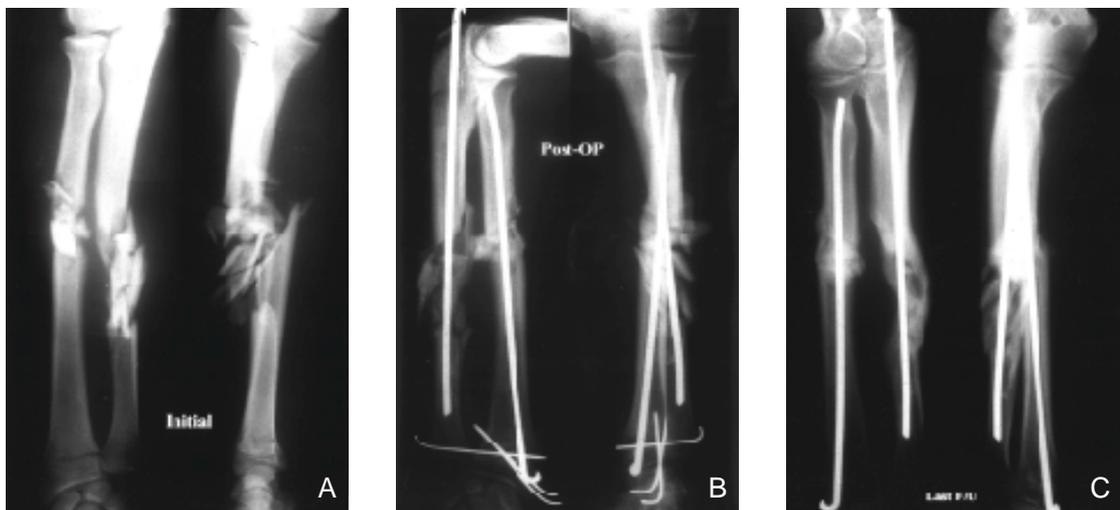
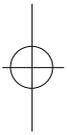
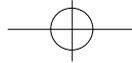


Fig 3-A. Both forearm initial AP and lateral radiograph of twenty-six years old male patient after traffic accident.
B. Postoperative AP and lateral radiograph. Both forearm bone were treated with intramedullary nailing.
C. Last follow up AP and lateral radiograph shows incomplete bone union with severe angular deformity of the ulna.. Pronation and supination of the forearm were 20 and 40 degrees, and the clinical result was poor.





Rush pin

. Knight Purvis 11)

29%

가

radial bow 가

가

Hughston⁸⁾ Patrick¹⁴⁾ Rush pin

가

. Street²⁰⁾

. Rush & Rush¹⁷⁾

Steinman pin Rush pin

Sage^{18,19)} Kirschner wire

38%

Sage¹⁸⁾ nail 가 Rush pin

6.2%

Smith Sage¹⁹⁾ Richard 16)

(10 12.5%

Rush pin)가

가 . Jinkins,

Lockhart, Eggers 9)

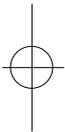
10 가

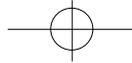
. Capen,

Jackson

Rush pin (prebent)

Lister tubercle 가





가

. DePalma⁶⁾

Anderson²⁾

, Kaufer 가 1/3

Mathews¹⁰⁾ 10

, 20 가 torsional stress

5 hole

Anderson

(radio-ulnar synostosis)

0-2.9%

3,5,15,21,22)

가

가

1

가

Danis, Muller^{4,9,13)}

Egger, Anderson^{1,2)} 가

2

, Danis⁴⁾ , 1

, 1

가

(primary bone healing)

. Anderson¹⁾

가

, ASIF

97.9%, 96.3%

Dondge⁷⁾ 97.8%

98.2%

. Muller¹³⁾ DCP

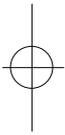
가

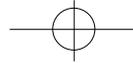
5-6holes

Lane¹²⁾

Rush pin

가





- 29, 1983.
- 16) **Richard R and Tarr MS** : The effects of angular and rotational deformities of both bones of the forearm. *J Bone Joint Surg*, 66-A:65-70, 1984.
- 17) **Rush LV and Rush HL** : A technique for longitudinal pin fixation of certain fractures of the ulna and of the femur. *J Bone Joint Surg*, 21-A:619, 1939.
- 18) **Sage FP** : Medullary fixation of forearm fractures. A study of the medullary canal of the radius and a report of fifty fractures of the radius treated with a prebent triangular nail. *J Bone Joint Surg*, 41-A:1489-1516, 1959.
- 19) **Smith H and Sage FP** : Medullary fixation of forearm fractures. *J Bone Joint Surg*, 39-A:91-98, 1957.
- 20) **Street DM** : Intramedullary forearm nailing. *Clin Orthop*, 212:219-230, 1986.
- 21) **Tarr RR, Garfinkel AI** : The effects of angular and rotational deformities of both bones of the forearm. An vitro study. *J Bone Joint Surg*, 66-A:65-70, 1984.
- 22) **Thomas GG and Colonel WWE** : Forearm fractures : treatment by rigid fixation with early motion. *J Bone Joint Surg*, 62-A:433-437, 1980.

