

# Outcome of Close Diaphyseal Fracture of Both Bones Forearm in Adult Treated by Well Fitting Intramedullary (Square) Nail & Dynamic Compression Plate: A Comparative study

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## ABSTRACT

**Background:** The achievement and maintenance of reduction of diaphyseal fractures of forearm are hindered by deforming muscular forces. The aim of this study to compare the results of close diaphyseal fracture of both bones forearm in adult treated by well-fitting intramedullary (square) nail & dynamic compression plate.

**Material & Methods:** The present study comprised of 60 patients with close fracture both bones forearm belonging to either sex of adult age group, treated in the department of orthopedics, Dr. B. R. Ambedkar Medical College, Bengaluru, Karnataka, India. All 60 cases included in this study underwent clinical and radiological examination at the time of admission; and type, site, displacement, rotation and angulation of fractures were determined. At follow up examination interval between injury & this examination was recorded & than clinical & radiological examination were carried out.

**Results:** The present study showed that the mean age of patients was 35 yrs, male to female ratio was 3.6:1 and right side were more common as compared to left side, mostly patients had indirect injuries (55%). comparison of functional end result between Hadden et al<sup>1</sup> different modalities of treatment and of our present study. Results of plating is comparable with Hadden et al<sup>1</sup> sereis but Nailing is inferior.

**Conclusion:** We concluded that functional end results to be excellent to good, plating is the best mode of treatment for fracture forearm bones as 83% excellent to good results had achieved but nailing also have comparable results as achievement of 76% excellent to good results.

**Key words:** Fracture of Forearm, Intramedullary Nail, Dynamic Compression Plate, Outcome.

## INTRODUCTION

The function of the forearm stems from a complicated movement of radius over ulna at the superior radioulnar joint at the elbow, at the inferior radioulnar joint and at the wrist. Fractures of the forearm, by disturbing this

mechanism. The achievement and maintenance of reduction of diaphyseal fractures of forearm are hindered by deforming muscular forces. Therefore, to achieve full return of function to prevent malunion & joint stiffness, to hasten convalescence, open reduction and rigid internal fixation by well-fitting intramedullary nail or dynamic compression plate remains the treatment of choice.<sup>1</sup>

Intramedullary nailing was popular in the past. It has certain advantages & disadvantages but was commonly used in past and with some indication in present scenario. After introduction of plate fixation for fracture forearm bones, especially dynamic compression plate by A.O group, the nailing of fracture forearm bones now given way to dynamic compression plating. But this too have some advantages and disadvantages.<sup>2</sup>

Though results of treatment of diaphyseal forearm fractures are difficult to analyze due to many variables, such as location and type of fractures, proportion of open and closed injuries, number of acute fractures, extent of

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associated soft tissue injuries.<sup>3</sup> The aim of this study to compared the results of close diaphyseal fracture of both bones forearm in adult treated by well-fitting intramedullary (square) nail & dynamic compression plate.

### METHODS

The present study comprised of 60 patients with close fracture both bones forearm belonging to either sex of adult age group, treated in the department of orthopedics, Dr. B. R. Ambedkar Medical College, Bengaluru, Karnataka, India. All 60 cases included in this study underwent clinical and radiological examination at the time of admission; and type, site, displacement, rotation and angulation of fractures were determined.

Open reduction and internal fixation by plates and screws was the choice of treatment for all unstable diaphyseal fractures but some of the patients who refused for plating due to cost of the plates and screws underwent well-fitting intramedullary fixation by square nail.

Preoperatively, the patients were prepared and operative procedure was carried out under strict aseptic precautions and under tourniquet.

Patient lies on his back with the limb resting on the side table. One shot of injectable antibiotic was given intraoperatively. For both bones separate incisions were made, for ulna subcutaneous incision was made and for radius posterolateral approach was used. Square intramedullary nails were used for fixation of both the bones.

#### Follow Up

At follow up examination interval between injury & this examination was recorded & than clinical & radiological examination were carried out.

### RESULTS

The present study showed that the mean age of patients was 35 yrs, male to female ratio was 3.6:1 and right side were more common as compared to left side, mostly patients had indirect injuries (55%) (table 1). comparison of functional end result between Hadden et al<sup>4</sup> different modalities of treatment and of our present study. Results of plating is comparable with Hadden et al<sup>4</sup> series but Nailing is inferior (table 2).

**Table 1: Demographic profile of patients**

	No.	Percentage
<b>Age Mean; Range</b>	35 yrs; (16-72 yrs)	
<b>Male: female</b>	3.6:1	
<b>SIDE</b>		
<b>Right</b>	33	55%
<b>Left</b>	27	45%
<b>MODE OF INJURIES</b>		
<b>RTA</b>	27	45%
<b>Indirect injuries</b>	33	55%

### DISCUSSION

The age of the patients varied from fourteen to seventy-eight years, in different series (Dodge and Cady, 1972<sup>5</sup>; Burwell and Charnley, 1964<sup>2</sup>) An average age of 29.3 years

was reported by Robertson (1961) and similar average age was reported by Smith, 1959; Dodge and Cady, 1972<sup>5</sup> and Anderson et al. 1975.<sup>6</sup> The low incidence females is due to their less hectic schedule & predominantly indoor lifestyle.

In the present series, right side involvement is 55% and left side involvement is 45%. This is similar with studies of Burwell and Charnley (1964)<sup>2</sup>, and Merk (1961).<sup>7</sup> Predominantly right sided involvement may be due to the excess activity of the dominant upper extremity.

**Table 2: Showing Functional End Results (Based On Hadden Etal<sup>27</sup> Criteria)**

Results	Present Study		
	Nailing	D C P	Hadden et al <sup>27</sup>
<b>Excellent</b>	17(56.60%)	20(66.60%)	60(54.50%)
<b>Good</b>	6(20.00%)	05(16.61%)	29(26.40%)
<b>Fair</b>	2(6.80%)	4(13.31%)	11(10.00%)
<b>Poor</b>	5(6.60%)	1(3.31%)	10(9.10%)
<b>Total</b>	<b>30(100%)</b>	<b>30(100%)</b>	<b>110(100%)</b>

In the present series the commonest mode of injury was road traffic accidents which accounted for 45% cases. Whereas injury due to indirect injury such as fall from wall or vehicle or hit by heavy objects constituted 55%. Smith (1959) has reported similar incidence of injuries due to road traffic accidents as 45% and due to fall were 36.2%, Grace (1980)<sup>8</sup> has reported similar incidence of injuries due to road traffic accidents as 45%, Burwell (1964)<sup>2</sup> 69% cases, Hadden (1983)<sup>3</sup>, reported 77% cases and Stewart (1958), reported 55% cases due to road traffic accidents.

Grace et al. (1980)<sup>8</sup> reported 80% excellent or good results, 11% acceptable results, 9% unacceptable results.

Lindvall, Sagi HC (2006)<sup>9</sup> found 97% union rate in compression plate in forearm with no refracture, no infection and no alteration of fixation. He used 4 cortical screw either side of fracture.

Visna P, Valcha M, Vitek M (2009)<sup>10</sup> found delayed union in 2 patients of compression plate group and 6 patients in intramedullary nailing group. Higher incidences of complication including proximal migration of nail noted in intramedullary nail group.

Sang KI Lee, Kap Jung Kim, Jae Lee (2013)<sup>11</sup> study 67 patients. Found 100% union in compression plate group and one case of non-union in intramedullary group. Restoration of radial bow and functional recovery more precise in plate group.

### CONCLUSION

We concluded that functional end results to be excellent to good, plating is the best mode of treatment for fracture forearm bones as 83% excellent to good results had

achieved but nailing also have comparable results as achievement of 76% excellent to good results.

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